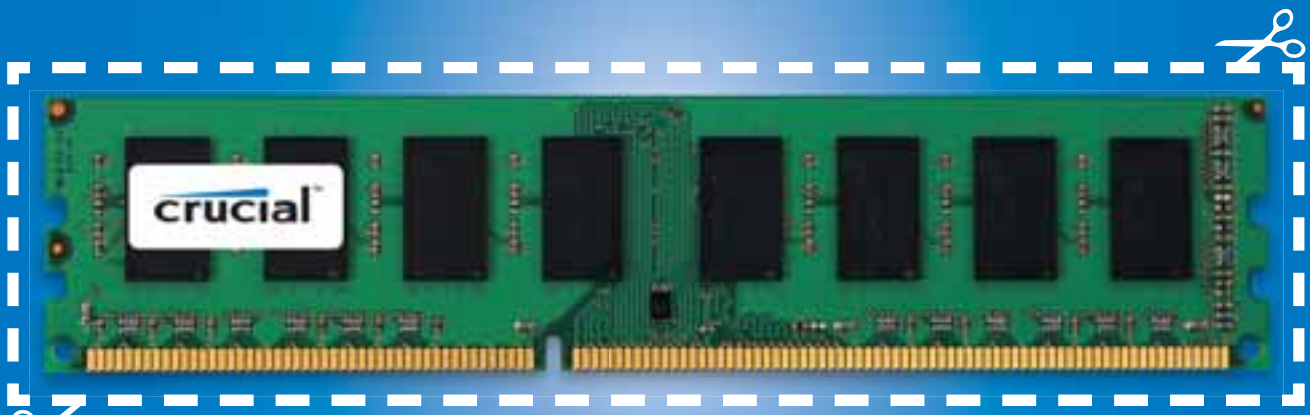

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Contents

February 2009

REGULARS

7 Editorial
158 Competitions
160 Contact us & *PCW* on the web
161 In the next issue
162 Flashback

INTERACTIVE

18 Letters
21 Gordon Laing – Inside information
22 Barry Fox – Straight talking
24 Guy Kewney – Kewney @ large

NEWS

8 Mobile vendors put a SoC in it
9 Mobile data speeds to take off
10 Nokia takes on £66 iPhone
11 HP ships a multi-touch laptop
12 Microsoft plans free anti-virus tool
15 320Mbit Wifi spells double trouble
16 Snapdragon shows how to smash Atom
17 Software is tuned up for ARM

GROUP TESTS

78 Ultimate power PCs
A selection of the best PCs money can buy

90 Mobile broadband
We check out all £15 per month services and put their networks to the test

101 Netbooks
Super-portable minis with a focus on the internet

COVER DISC

131 Six free programs
Get your hands on Uniblue Diskrescue 2009, Ashampoo WinOptimizer 5, RecentX 2.0, Alpha Five 9, Panda Internet Security 2009, Azteca and loads of freeware, shareware and trial programs

COVER FEATURE

26 101 FREE WINDOWS PROGRAMS
Our best ever collection of tools and utilities

GROUP TEST

78 ULTIMATE POWER PCS
Intel's new Core i7 shows just how fast it really is in our round-up of Ultimate PCs

FEATURES

26 101 Free Windows programs
Our best ever collection of tools and utilities

37 Dr PC will see you now
Find out how computers are playing a key role in healthcare

44 Memory explained
Everything you need to know about PC memory

50 Have a break get a hobby
A round-up of hobby-related PC and internet resources

Read something to remember in our PC memory feature

GROUP TEST

90 MOBILE BROADBAND SUPERTEST

All £15 monthly services reviewed

GROUP TEST

101 NETBOOKS FOR WEB SURFERS

Portable mini-notebooks are coming thick and fast

REVIEWS

55 **Contents**

Hardware

56 Shuttle X27D

Peripherals

57 T-Mobile G1

58 Archos 5 with DVR Station

59 Nokia N96

Lexmark X5650

62 Logitech Digital Video Security System

Devolo DLan 200 AV Wireless G Starter Kit

63 Terratec Noxon iRadio Cube

Iomega Storcenter ix2 2TB

64 Antec Skeleton

Asus P6T Deluxe

Ixos XMM238 Cube

Shure SE102 Earphones

Software

65 Ashampoo Photo Commander 7

66 Webroot Internet Security Essentials

Uniblue Driver Scanner 2009

67 Filemaker Bento 2.0

Abbyy Fotoreader

Games

68 Left 4 Dead

69 **How we test**

70 **Best Buys**

Lexmark's X5650 printer packs plenty of features but won't break the bank

158 **Win a Shuttle PC or a Brother multifunction printer**

BUSINESS

107 **Contents**

108 **Keep your data safe**
It's easy to safeguard your data – we explain how

Reviews

110 Dell 5330dn Laser Printer

111 Netop Remote Control 9.2

112 Benq MP522ST

115 Primera Technology Disc Publisher

116 VMware Workstation 6.5

HANDS ON

119 **Contents**

120 **Question time**
Our experts offer advice

124 **Hardware**
How to squeeze every last drop out of your processor

126 **Performance**
There are times when you should avoid certain updates

128 **Windows**
Reclaim control of your Vista PC

138 **Linux/Unix**
What to expect from Intrepid Ibex

140 **Digital imaging & video**
Everything you need to know about your camera's memory card

142 **Word processing**
How to insert and use bookmarks

144 **Spreadsheets**
A selection of hidden Excel gems to boost your productivity

146 **Web development**
Some solutions for making your website mobile

148 **Networks**
Learn some simple, effective access controls for public computers

150 **Databases**
How to use the Datevalue function to solve migration woes

152 **Visual programming**
An intro to the cloud

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Editorial

kelvyn.taylor@incisivemedia.com

The power and the glory

Small may be beautiful, but there's still a place for the power and flexibility of a desktop PC, says Kelvyn Taylor

It's been a while since we looked at the top end of the PC desktop market, and for good reason: desktop PCs costing several thousand pounds aren't exactly what the great majority of people are buying right now.

Yes, the joystick army of dedicated gamers will always dig deep into their piggy banks for the promise of a few extra frames per second, and engineers, scientists and creative types are always short of a few processor cycles (Nvidia's Tesla desktop supercomputer should get their attention – see page 10). But these combined hordes still represent a pretty meagre portion of the population at large, which raises the question – why bother covering such systems?

Regular *PCW* readers will know the answer – "It's the technology, stupid!" And they'd be absolutely right, although there's a bit more to it than that.

'In my mind, the sheer flexibility of a desktop PC remains its biggest attraction'

Intel's new Core i7 processor is a major new architecture that promises great things, such as multi-core CPUs, integrated memory controllers and reduced energy consumption. And today's high-end graphics cards can do things that professional graphics workstations wouldn't be ashamed of.

But there's something else about a desktop PC that makes it the system of choice for the true enthusiast. It's not just the comforting whir of the fans or the chattering of the hard drives. With a decent desktop PC you know that, with the right components, you can get it to do pretty well anything you want. If you're short on optical drives, add a few more. Multiple satellite TV tuners? Not a problem. Specialised soundcards or huge hard disk arrays? Be my guest.

In my mind, it's the sheer flexibility of a desktop PC that remains its biggest attraction, and that still makes me lust after some of the models on display in our group test on page 78. Some may be a bit over the top in terms of styling and accessories, but they are great showcases for components that will eventually filter down into the dull £299 boxes that line the supermarket shelves these days.

My PC at home is probably nothing out of the ordinary compared to those of the typical *PCW* reader – it's a four-year-old box with a 3GHz Pentium 4 CPU, 2GB of Ram, three hard drives, a couple of DVD burners, card readers, dual digital TV tuner and the usual built-in gubbins like networking and audio. But I wouldn't swap it for a notebook of any kind, because you just can't mix and match components in a notebook to the same extent as you can in a desktop. I do have a couple of old notebooks if I need to get outside in the summer, but they're definitely specific-purpose machines.

There's a wide range of things you can plug into USB ports, Firewire ports, PC Card slots and the like, but you can end up with a tangled monster sitting on your desk unless you invest in a decent docking station. And there's still nothing quite so satisfying as opening up the case and clipping a new PCI expansion card into a motherboard.

In the crazy calendar of magazine publishing, we're already approaching Easter, but in the real world this issue is our last of 2008. I'd like to take this opportunity to thank you for all the valuable comments and feedback we've received during our 30th anniversary year, and we're looking forward to serving you up more great news, practical advice and features during 2009 as *PCW* moves into its fourth decade. **PCW**

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NEWS

IN THIS SECTION

NEWS

10 Nokia takes on £66 iPhone
Enter the personal supercomputer

11 HP's multi-touch laptop
Plug-in graphics booster for laptops

12 Microsoft to offer free anti-virus
Apple U-turn on malware warning
Life images go online

16 Snapdragon the atom smasher?
AMD cops out of ultra-mobiles

17 ARM gets Flashy
More 'Vista Capable' red faces

ANALYSIS

15 **320Mbit Wifi double trouble**
Proxim's new 11n access point uses two radios to get twice the speed. But can it really be better than a wired network?

Keep up to date with the news, reviews and competitions in our weekly newsletters. To subscribe go to www.pcw.co.uk

Mobile vendors put a SoC in it

Battle lines are being drawn between technologies capable of driving the new ultra-mobile formats, which have bought the handset and notebook industries into competition.

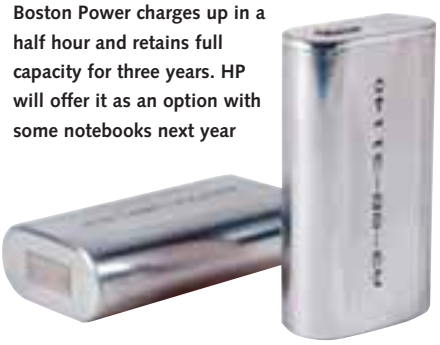
The machines pit Intel processors and the wealth of PC (and potentially Apple) software against systems-on-a-chip (SoCs), mostly using ARM cores, coming from companies steeped in techniques of paring down every microwatt used by handsets. AMD seems to have opted out of the market (see page 16).

Qualcomm, a company usually associated with communications chips, last month showed off its Snapdragon SoC, which is said to allow a netbook to be always-on for a working day.

Qualcomm says Snapdragon devices will hit the market late next year and that manufacturers committed to using the platform include traditional x86 notebook makers such as Acer, Asus, Samsung and Toshiba, as well as C-motech, Compal, Foxconn, HTC, Inventec, LG Electronics and Wistron.

Nokia, which was offering ARM-based mobile-internet devices before Intel came up with the name, is rumoured to be preparing a new model. So is Google.

The SoCs can run Linux and a variety of office suites that are file-compatible with Microsoft Office, though generally with fewer features. But the new platforms are seen primarily as web-access devices rather than general-purpose platforms, and browser capabilities could be critical even if these categories become blurred.



Battery technology will be critical for the new mobiles. A new Li-ion battery from Boston Power charges up in a half hour and retains full capacity for three years. HP will offer it as an option with some notebooks next year

This has introduced competition over rendering technology. The web's basic HTML description language is barely up to the task of delivering high-quality content to a variety of devices. Sun last month launched its Java FX Rich Internet Application (Ria) platform that puts it in competition with Adobe's Flash and Air, and Microsoft's Silverlight (see **www.pcw.co.uk/2231992**).

ARM has just announced a collaboration with Abobe to optimise its architecture for Flash and Air (page 17). Intel argues that its platform offers best support for web technology, but the success of Apple's iPhone means sites no longer dance exclusively to the Wintel tune. The lack of a single standard rendering technology is a big problem for content providers and the signs are that it will get worse.

Intel is not standing still. Its new 32nm-scale manufacturing process, which will help it make more frugal chips, is ready to go – and details have emerged of a 32nm SoC codenamed Medfield, expected some time in 2010.

They came in a roadmap published by UBS Securities in the US, which reported that Medfield will integrate virtually all the functions of a PC, including the memory controller, I/O and graphics accelerator. It will also be available in dual-core and single-core versions. A 45nm SoC called Pineview is expected in 2009 (see **www.pcw.co.uk/2232173**).

Intel chips are relatively heavy on standby power. Intel technology guru Pat Gelsinger said in July that it will take the company a couple of years to get this down to ARM levels, which gives rival SoCs a chance to get established. At the very least they will keep Intel on its toes. *Clive Akass*

Google puts old magazines online

Google has introduced a range of magazines to its online publication archive at **www.books.google.com**, following a deal with publishers that will allow it to digitise millions of articles.

They include copies of *Popular Science* going back to 1872. The one pictured is from February 1920 – around the time the magazine started introducing colour pictures.

Other magazines going online include Popular Mechanics, New York, Jet, American Cowboy and Black World. Google is partnering with publishers to digitise millions of articles.

Financial arrangements are not yet clear. Google's relationship with print publishing has been edgy, with some publishers complaining that they get nothing from money made from their content

Photo archives online – see page 12.

Mobile data speeds set to soar

Cellular links offering download speeds of 42Mbits/sec could be available within two years, according to chipmaker Qualcomm.

They will use HSPA+, the next-generation version of HSDPA and HSUPA, the download and upload varieties of 3G High Speed Packet Access links.

Qualcomm believes HSPA+ will complement rather than rival 4G Long Term Evolution (LTE) links, filling in the gaps in rural areas untouched by the faster technology.

The company demonstrated a test HSPA link with a 21Mbits/sec downstream peak at a showcase event in London.

Enrico Salvatori, senior vice-president and general manager of Qualcomm Europe, said the timetable for a rollout of the technology was out of the company's hands.

The HSPA+ spec has yet to be finalised, and cellullar companies have to upgrade their infrastructure. Devices could be available in the second half of next year.

Initial implementations are expected to hit 41Mbits/sec on the downlink and 11Mbits/sec up, but a Qualcomm roadmap shows HSPA speeds of 84Mbits/sec down and 23Mbits/sec up by 2012, with the same chip supporting 4G LTE speeds of 143Mbits/sec down and 75Mbits/sec up.

"On a very aggressive timetable you could see LTE devices by the end of 2010, and services by early 2011," Salvatori said.

The Qualcomm chart did not show Wimax. Salvatori said this was because the company did not think the demand for Wimax links would come close to that for LTE.

"We are open about this. We will support Wimax if there is a demand for it," Salvatori said.

The real inventor of the mouse dies

The 40th birthday of the first public demonstration of the mouse was marked last month with a celebration of its inventor, Doug Engelbart. The event also brought the sad news of the death of Tom Cranston, who co-invented the trackball, the mechanism of the mechanical mouse, more than a decade before Engelbart.

Regular readers may recall an interview with Cranston for a special Retro edition of *PCW* in 2001, when he was 81.

Tom Cranston and his colleague, Fred Longstaff, came up with the trackball when working on a Canadian Navy project that began in 1949.

Their story is a reminder that the graphical user interface did not start with Apple, nor even Xerox. It began with World War Two radar screens, or even earlier if you count the oscilloscope on which athey were based.

These were, of course, analogue devices. Cranston and Longstaff were part of a team digitising the Canadian Navy's radar system and they faced the problem of how to place a cursor over a target blip and register its co-ordinates.

The simplest way would have been to use two variable resistances, but they came up with a better idea. Cranston had seen someone using a wheel on a stick – like a miniature pedometer – to measure distances on a chart. "We need something like that which works simultaneously in two dimensions," he said to Longstaff.

Cranston in 2001. Below: the only known picture of his trackball – in effect, an upside-down mouse

Longstaff came up with the idea of two follower wheels resting at right angles to a ball that rolled in any direction. The prototype used two pairs of wheels driven by a standard 4in Canadian bowling ball resting on an air bearing.

Cranston and Longstaff seem to have been unaware they were doing anything momentous: they were engineers addressing a problem. Cranston was most impressed by the fact that he could address screen positions using numbers, which was novel to anyone used to analogue systems.

He was right there at the birth of our digital world, and talking to him felt like talking to the first man who stuck a stylus into clay.

You can read the full 2001 interview at **www.pcw.co.uk/2045763** – click PDF link to get the version with images. *Clive Akass*

● Logitech has just announced that it has shipped its billionth mouse.

Laptops for life scheme rollout

Fujitsu-Siemens' Lifebook4Life scheme will let customers get a replacement laptop every three years for the rest of their lives. Customers buy a £50 extended warranty on Lifebook S, Lifebook T, Lifebook E, Lifebook Q and Lifebook P models. The scheme is limited to 10 machines per buyer.

The value of the replacement Lifebook will be equivalent to the original purchase price, plus 10 per cent for every three years.

Businesses will be able to keep exchanging as long as they keep trading under their original name and ownership.

Fujitsu-Siemens marketing manager Jason Howe said the company would make money from the scheme by selling goods and services to its customers. "Our financial guys say it'll work."

→ **www.lifebook4lifeclaims.co.uk**

Vista SP2 beta code available

A 400MB public beta of Service Pack 2 for Windows Vista and Server 2008 is available from a link on the *PCW* Downloads site at **http://tinyurl.com/6d3lok**.

You can get a single-language 40MB version, which installs only what your configuration needs, via Windows Update. Just follow the instructions at **http://tinyurl.com/ 6e3pv8**. Documentation and release notes are at **http://tinyurl.com/57ojq6**.

SP2, a collection of hotfixes and updates, is not nearly as major an update as SP1 was. It adds a few new features, such as support for writing Blu-ray data discs and Bluetooth 2.1.

Microsoft warns users to read the release notes as there are known problems with older security software, such as AVG Antivirus 7.x or Spyware Doctor 5.x. And remember this is beta code – you shouldn't use it on a working system without making a full backup.

In brief

Mobile browser
A new Skyfire browser allows smartphone users to view full web pages, including those with active content such as Youtube. The free download supports handsets running Windows Mobile 5 or 6 and Symbian phones using the S60 user interface, such as Nokia's N series.

.tel tells all
The.tel top-level domain for web addresses links directly to content rather than being translated to an IP address by a Domain Name Server. It will allow you to publish contact details and links under your own domain in a format that can be viewed on any device.
→ **www.pcw.co.uk/2231799**

Mobile caps
The European Union (EU) has agreed to cap the price of mobile texts next year at €0.11 from a current average of €0.29, and the wholesale price of roaming data to €1 per megabyte.
→ **www.pcw.co.uk/2231507**

iPhone Linux
A group of amateur developers has ported the Linux OS to Apple's iPhone and iPod Touch, though it does not support major features such as touchscreen and wireless networking. Developers warn it is not for novices as it can cause damage if components are not backed up correctly.
→ **www.pcw.co.uk/2231703**

Android unchained
Google has released an unlocked Android-based handset to help developers build applications for the mobile platform. The Android Dev Phone 1 costs £270 to developers who register on the Android Market site. The platform got a boost last month with news that Sony Ericsson is one of 14 new members of the Open Handset Alliance and plans to develop an Android phone.

N97 to take on £66 iPhone

Apple was reported to be preparing a $99 version of its iPhone last month as Nokia launched a new touchscreen rival.

The Nokia N97 smartphone, which has a 3.5in tilting screen and slide-out Qwerty keyboard, aims to provide an always-on window to the web. Jonas Geust, Nseries vice president, described it as "the most powerful multi-sensory mobile computer in existence".

It includes an Assisted GPS sensor and electronic compass, with the ability to offer timely local information.

The home screen can be personalised with widgets to provide easy access to the information particular to each user. It has a five-megapixel camera with a Carl Zeiss lens and boasts 32GB of onboard memory with a micro SD slot for up to 16GB of expandable memory.

N97 has a slide-out Qwerty keyboard

It will pack in a 1,500mAh battery, said to last up to 16 days on standby, or provide 37 hours of continuous music playback or four and a half hours of video. The handset is expected to ship in the first half of 2009 for around €550 (£469) before taxes or subsidies.

If reports are correct, this would put it up against the $99 (£66) iPhone. This will be sold in the US by Walmart, which trades as Asda in Britain. Sales will be tied in the US to a two-year AT&T contract, and O2 in the UK, if present commitments are continued.

The UK website Rethink Wireless says the iPhone will have 4GB of memory instead of the 8GB or 16GB of its more expensive siblings.

Personal supercomputer uses GPU power

Nvidia has launched a personal supercomputer called the Tesla, which exploits the power of its C1060 graphics processing unit (GPU) and costs about as much as a high-end workstation.

The chip has 240 scalar processor cores, capable of 933 billion floating-point operations per second (Gflops), and sits with 4GB of memory on a dual-slot PCI Express card – up to four of which can be yoked together using Nvidia's SLI technology.

The Tesla, which can run Linux or Windows, will not be made by Nvidia. It is a reference platform designed to be implemented by other manufacturers.

A typical Tesla application, Manifole System Release 8, visualises geographic data

Systems are available now from Viglen, Armari and Cad2. Viglen's CL2000 PSC-2 system is based on an Intel quad-core processor with 8GB of memory and two C1060s, for a starting price of £3,999.

Nvidia says this is a fraction of the price of computer clusters offering comparable performance.

Both Nvidia and rival ATI, now owned by ARM, have been plugging the fact that GPUs can offer supercomputer-class performance on number-crunching tasks that can exploit massive parallelism. Most are academic or industrial design applications.

Nvidia offers a dialect of the C programming language, called Cuda, to facilitate coding of its GPUs.

Palm layoffs mark nearly a decade of decline

Palm is to cut back its US workforce and reorganise globally after poor results and a decline going back to the turn of the millennium.

The company (then a subsidiary of US Robotics) became the undisputed handheld market leader in 1996 with the launch of the Pilot 1000, the first successful graphical PDA, and once enjoyed the trendy image of a second Apple.

I trace its decline to a Comdex in the late 1990s, at the dawn of the smartphone era, when the US was untypically behind Europe in mobile telephony.

Palm had a huge, expensive stand with not a single telephony-enabled device. Executives I spoke to saw nothing amiss. Predictably smartphones, mostly designed in Europe, were soon outselling PDAs and Palm became an also-ran.

Chief executive Ed Colligan blamed the latest decline on the global downturn, although revenues are still $190m. But it is in a tough market, with RIM's Blackberry leading the business market and Apple's iPhone and Google's Android phones taking on Nokia on the high street. *Clive Akass*

HP ships multi-touch laptop

HP has launched a portable version of its Touchsmart desktop range supporting multi-touch control similar to that on Apple's iPhones – a feature that will not be supported by Microsoft until the launch of Windows 7.

The HP Touchsmart tx2 tablet convertible allows music, files and pictures to be navigated using natural gestures rather than the standard point and click. The 12.1in screen twists round to allow it to be used with the built-in keyboard like a standard notebook.

HP's elegant Touchsmart desktop range includes 22in and 25.5in all-in-one models designed for the living room.

Asus last month launched a kind of poor man's version. The Eee Top 1602 has a 15.6in widescreen monitor, with a mic and a 1.3-megapixel camera for video calls, which costs just £449.

These all-in-one models are sleek and elegantly designed

The tx2, which uses an AMD Turion dual-core processor and ATI Radeon HD3200 graphics, comes with an infra-red remote that tucks into the Express Card slot. Prices start at £799. But you are out of luck if you want one for Christmas: they become available in January.

It has yet to be reviewed so we don't know how well the touch interface compares.

But it could be argued that any touch interface is of wider and more convenient use on a horizontal tablet than on an upright screen. The Touchsmart interface is versatile, allowing you to manipulate and navigate images.

Via has launched a 10.4in touchscreen panel PC designed for specialist applications. The Vipro VP7710 uses a 1.6GHz Eden, or a 1GHz C7 processor, with up to 1GB of memory. It supports XP, XP Embedded, Windows CE 6.0 and Linux, but may also be able to run the touch-enabled Windows.

Plug-in box boosts notebook graphics

Fujitsu Siemens has launched a notebook with a plug-in box that boosts graphics performance by up to 470 per cent.

The Amilo Sa 3650 comes with a port, linked directly to a PCI Express 2.0 eight-lane bus, into which you can plug the Graphics Booster box containing an ATI Mobility Radeon HD 3870 graphics card and 512MB of dedicated graphics memory.

This also provides one DVI-I, one HDMI and two extra USB2 ports. You can use the notebook by itself on the move, or plug in the booster for better graphics, see **http://tinyurl.com/6qbwzz**.

The Amilo graphics booster connects directly to the PCI Express 2.0 bus

An innovative design in Lenovo's Ideapad S10e netbook allows you to check email, video-conference, listen to music, or browse the internet without fully booting up.

The 10.1in, 1.2kg mini-laptop with LED backlit display comes with a choice of XP Home, XP Pro or Novell SLED 10 Linux operating systems and a 4GB solid-state drive or a hard drive up to 160GB. Prices start at £299.

Solar pavements and life recording coming your way

The sun's energy will be harvested by just about any available surface, thanks to paint-on solar cells, according to IBM. The company says the cost of developing such systems is dropping to the point where it can be used on pavements and windows.

It is one of five predictions highlighted in a report on future trends. The other four are:

- The internet will become even more social as users gain the ability to surf web pages and even write and send emails using just their voice.
- With life recording, everything you do and say will be recorded and analysed, allowing a computer to jog your memory when necessary. Linked with a GPS system you could be reminded, say, to pick up the groceries when you pass your usual supplier.
- Genetic mapping will transform healthcare over the next five years.
- Shoppers will be able to select items on a screen and have them delivered to a shop's changing room.

→ **www.pcw.co.uk/2231282**

In brief

Mobile data

Virgin Mobile is offering handset data access for 30p per day. Downloads are limited to 25MB a day under its a fair use policy, with each extra megabyte costing £2.

O2 is offering 3G broadband for laptops at £2 a day for up to 500MB, £7.50 a week for 1GB, or £15 a month for 3GB. You also have to pay £29.99 for a USB modem and you get unlimited access to 6,000 Cloud Wifi hotspots.

Gaming keyboard

Logitech's £75 G13 Gameboard is designed to complement a keyboard and mouse, giving gamers 87 new ways to control the action.

→ **www.logitech.co.uk**

256GB SSD

Samsung has started production of a 256GB solid-state drive (SSD) with the fastest-yet read/write speeds of 220/200Mbits/sec – the drive can be wiped in fewer than three minutes.

→ **www.pcw.co.uk/2231006**

Quick caller

Asus claims its new P565 business smartphone, which uses an 800MHz processor and runs Windows Mobile 6.1, is the fastest in the world. But this power comes at the price of just three hours of 3G talk time, or four hours on 2G.

→ **www.pcw.co.uk/2230855**

IBM superbrain

IBM is pairing up with leading US universities to build a computer that emulates the human brain to break the 'conventional programmable machine paradigm'. The researchers have been awarded $4.9m (£3.28m) by the US Defense Advanced Research Projects Agency.

→ **www.pcw.co.uk/2231086**

Vet your calls

A £97.50 gizmo from Truecall lets you route telemarketers and other nuisance callers on a zap list to a polite message that you're not interested, or lets them hang on without your own phone ringing.

People on your star list get through as normal whereas others can be put on hold while the device checks whether you want to take the call. It also acts a call recorder and answering machine. Watch out for a review in *PCW*.

→ **www.truecall.co.uk**

Eye spy...

A £29.99 utility lets users spy on a partner's online activities by logging every site they visit, recording their chatroom and and copying emails. Andy Felton, director of Guardian Software Solutions, said: "Yourspy was developed to give a partner a quick, reliable and affordable answer to their suspicions."

→ **www.yourspy.co.uk**

Virtual threat

Virus writers are likely to unleash a new class of malware that cannot be seen by a PC's operating system because it runs as a virtualisation layer, says Messagelabs. Senior analyst Paul Wood said the only cure might be an OS reinstall.

→ **www.pcw.co.uk/2231259**

Unix nix

Software house SCO has been told to pay £1.63m to Novell after a judge upheld the latter's claim to own the code. It is the third time since last August that SCO's own claim has been rejected.

→ **www.pcw.co.uk/2231386**

Microsoft plans free anti-virus

Microsoft is discontinuing its Live Onecare security product from 30 June next year and is replacing it with a free tool called Morro.

It says Morro will offer better protection because paid-for products can be difficult to maintain, particularly in emerging economies where card payments are not available.

Fewer people in India, Brazil and China use anti-virus software, partly because a higher proportion of new users do not understand the risks.

Morro will use the same security engine as Microsoft's business product, Forefront, according to Amy Barzdukas, senior director of product management.

Microsoft will not incorporate Morro into Windows to avoid legal action alleging unfair competition.

Anti-virus companies appear unconcerned by Morro, which will not be the only free anti-virus product on the market. The entry-level version of Grisoft's AVG is already a popular download.

An F-Secure spokesman said: "The influence of the free anti-virus market on F-Secure is not anticipated to change significantly due to Microsoft's entry."

And McAfee noted: "With Onecare's market share of less than two per cent, we understand Microsoft's decision to shift attention to its core business."

Microsoft has also cancelled its Equipt service, under which home users could lease Microsoft Office and Onecare, less than a month after its UK launch. Sales will continue for a few weeks more but the service will stop this year.

Microsoft would not say if subscribers will be able to keep their copy of Microsoft Office 2007 Home and Student Edition.

Apple under fire for U-turn on malware

Apple has come under fire after withdrawing advice that its users should install anti-virus software.

A posting on its support site had recommended three programs – Intego Virus Barrier, Symantec Norton Antivirus and McAfee Virus Scan – despite Apple making much of the fact that Macs are less susceptible to malware than PCs.

Security experts say the Mac OS is not invulnerable and that the PC's much larger user base makes it better target. But many Apple users do not bother to install anti-virus software and, with Mac sales rising, there are fears the machines could be susceptible to mass infection.

Graham Cluley, senior technology consultant at security firm Sophos, said there has been a rise in Mac malware. In August, experts discovered a tool for creating Trojans that allows intruders remote access to a Mac.

"More recently, and more seriously, we discovered the OSX/Jahlav-A Trojan, which has been deliberately planted on websites waiting for Mac users to visit," said Cluley. "This is not a proof-of-concept threat; it is real, and regular Mac users can get infected."

An Apple spokesman said the advice on security, which was posted for a year before attracting comment, had been removed because it was old.

Cluley said the advice should have been updated rather than removed. "The Mac does include some cool built-in technology to help protect against security threats [but] these can be circumvented through simple social engineering tricks that we see used by Windows malware every day," he said.

Century's defining images to be stacked up in Google

Google is putting a library of 10 million images online, including the entire photo archive of *Life* magazine. Around 97 per cent of the images have never been seen before and two million are already available to view through Google's image search. The rest will be posted in the next few months.

The *Life* library includes some of the iconic images of the 20th century, including the raising of the US flag on Iwo Jima during the Second World War.

The Google collection, which includes other archives, has images of New York going back to the 1880s and Hugo Jaeger's pictures of life in Nazi Germany. You can search for Life pictures by adding the term 'source: Life' to the Google search box. *Life* magazine was famous for its photojournalism, but folded in 2007 after 124 years. Framed photos from the archive can be bought (in the US at least) for around $80 (£51). This is not the only photo archive opening up online. The German Federal Archive has made 10,000 images available to Wikimedia Commons on **http://tinyurl.com/5hghq6**.

New Yorkers listening to a car radio for news on the assassination of President Kennedy in 1963

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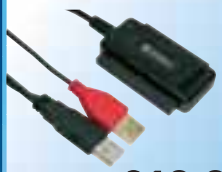

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320Mbit Wifi spells double trouble

Proxim's 11n access point uses two radios to get twice the speed, but does it risk jamming the airwaves and can it really be better than a wired network? Clive Akass reports

US Wifi specialist Proxim says its new Orinoco AP-8000 802.11n access point can move data at 320Mbits/sec – more than three times faster than most wired networks. Proxim says it is so fast that businesses can consider using it instead of a wired network.

However, the Proxim access point achieves its top speed through dual-radio. In effect, it uses two 11n links at once, reviving a controversy that dogged earlier Wifi implementations.

The official 11b version of Wifi used 20MHz channels in the 2.4GHz band. By the time 11a and 11g came along, these were being 'channel-bonded' into 40MHz channels, doubling the throughput but sparking criticism that users were 'hogging the road'.

Wifi using these frequencies, which offer only three non-overlapping channels, is now supposed to revert to 20MHz if there are other networks within range, which is nearly always the case in cities.

Links using 11a and 11n flavours of Wifi are free to double up to 40MHz in the 5GHz bands, where there are up to 24 20MHz channels available (or 12 40MHz channels). Sorting all this out took a lot of tussling in the standards committees.

What the Proxim access point does is to aggregate two 40MHz channels. If everyone else followed suit, that would leave just six non-overlapping channels at 5GHz – and even that assumes all are usable.

Available spectrum varies between countries, in some cases to avoid frequencies used by radar. In the UK, for example, upper 5GHz frequencies, known as Band C, are restricted to licensed users.

All of this can result in a drastic reduction of available spectrum.

At the same time 11n Wifi is said to double the effective range of the link, which in theory quadruples the area over which contention is likely to occur. And that's not counting vertical contention between floors.

Reports of current 11n deployments are positive, and Proxim claims an impressive 170Mbits/sec rated speed even for its single-radio AP-800 access point, sister to the AP-8000.

But can a Wifi network really be better than a wired one, even with speeds peaking faster than on a wired 100Mbits/sec network?

Wireless speeds will often be constrained by the wired network because the access point is sitting on it, although newer networks are rated at 1Gbit/sec.

And peak speeds matter less than what users can expect in practice. On a wired network you have contention only between users; Wifi, in cities at least, almost invariably introduces a second layer of contention in the use of the airwaves by neighbouring networks.

Proxim says its new access points use dynamic frequency control to avoid locally used frequencies. But with 40MHz channels there are fewer alternatives to choose from.

On large campus sites, where there are no neighbours to shout down, and a network manager can carefully position access points and control their use of the spectrum, this may not matter.

Proxim says it deployed five of its new access points at Microsoft's Tech Ed conference in Barcelona; each served an average of 70 users and the data rate peaked at 175Mbits/sec. Robb Henshaw, senior manager of corporate communications, agreed that sporadic access could be a problem in such circumstances.

He added: "Network planning took care of possible interference by using channels appropriately. Since the throughput in a network is an aggregate of all the clients, the highest throughput level was not sustainable for long periods. But our observation was that the network was very stable even with more than 70 clients connected while running the throughput tests."

Henshaw argued that the increased risk of contention from 11n's greater range was offset by fewer access points being needed to cover a given area.

But private users have no control over how many access points are in range, or what frequencies they are using. And while the Proxim kit is not targeting that market, enterprise features tend to migrate to consumer products, especially when they let manufacturers put a bigger number on the box. You can see it now: 320Mbit Turbo!

Also, high-definition video will increase network traffic. Then there is the general issue of radio pollution. Even if Wifi can replace a wired network, is it not better to use radio only where necessary? Wifi was designed as an edge technology, complementing a wired network, and it should surely stay that way.

→ **www.proxim.com**

FON hotspots make BT's wireless broadband glow

Wifi traffic on BT's Openzone and FON networks has doubled in a year, the company has reported in its half-year figures. In just one week in September, people clocked up a record 10 million minutes of usage.

BT wireless broadband director Dave Hughes said that BT FON, which opens members' Wifi access to fellow subscribers, had increased the number of access points. Members create Wifi hotspots by sharing some of their bandwidth via a separate channel on their wireless routers. "It is great to see users embracing broadband on the move," he said.

According to the company, it has 120,000 hotspots in Britain, like the one pictured, although possibly without the decorative users.

BT Openzone hotspot... traffic has doubled

Snapdragon shows how to smash Atom

Powered by the energy-efficient Snapdragon system-on-a-chipset, Qualcomm's netbook aims to trump Intel Atom devices by letting users work all day without power top-ups or extra batteries

Qualcomm has showcased a prototype netbook based on its Snapdragon 8250 system-on-a-chip (see page 8), with a claimed always-on battery life longer than a working day.

The Inventec-made tablet convertible, called Alaska, has an 8.9in touchscreen that twists round to allow the use of the keyboard. For navigation in keyboard mode, there's a slideover optical button, although the one on the prototype did not work.

You just lift and twist the Alaska's touchscreen if you need a keyboard

The Snapdragon 8250 has a 1GHz ARM-based general-purpose processor and a 600MHz digital-signal processor. It supports Wifi, Bluetooth, Assisted GPS, 720p high-definition decode, a 12-megapixel camera and XGA video. It also supports GSM, GPRS, Edge and HSPA networks. A sister chip, the 8650, supports CDMA 2000.

Judging from a test rig at a Qualcomm event in London, which played a 720p video, the Snapdragon 8250 is impressively efficient. The chip, which is smaller than a thumbnail, did not even feel warm to the touch.

Qualcomm is also developing a 45nm dual-core chip clocked at 1.5GHz, the Snapdragon 8672. Staff marketing manager Anita Hix said the 8672 was expected to be more power-efficient than the single-core chipset.

The 8672 will support full 1080p HD video recording and playback, and HSPA links.

The devices will compete with products using Intel's Atom chips, which cannot match them on standby drain – the all-important power draw for always-on devices. Snapdragons also incorporate a wealth of functionality that Intel has to put on peripheral chips.

The ARM-based core architecture supports Linux (see opposite), Windows Mobile, Android, and Qualcomm's own Brew mobile platform. Adobe has pledged to work with ARM to improve Flash support, and Silverlight is expected to work with the Windows Mobile platform.

Although Intel claims the new platform will not match the PC web experience, the success of the iPhone and iPod Touch, which also use ARM chips, has made it clear that site designers must consider more than just the PC.

Buyers of first-generation devices will still probably need to balance the Snapdragon's power efficiency against the wealth of software for the PC. Qualcomm showed Alaska running an open-source office suite called Thinkfree.

Equally important is the question of whether non-Intel platforms can support handwriting recognition technology as good as that on Microsoft's Tablet PC. Tablets to date have been expensive, power-hungry and cumbersome, but smaller, cheaper devices could take handwritten input into the mainstream if screen texture were also improved.

Handwriting recognition could be a suitable task for the dual-core Snapdragon, although Qualcomm does not seem to have considered the possibility. The first device, Intel-based or not, to crack the input problem on these small devices could scoop the market.

Simon Hickman, ARM's regional mobile computing manager, said he was not at liberty to name vendors but expected machines running ARM Cortex A8 or A9 processors to appear in mid 2009. They will use a specially optimised version of Ubuntu Linux (see opposite), and come with the Microsoft-compatible Openoffice.org suite.

Hickman said the ARM devices would run for at least eight hours (the 'working day' grail for notebook manufacturers) without a charge. Intel-based notebooks that claim to run all day away from the mains tend to have extra batteries.

AMD opts out of ultralights and targets Yukon at 'larger minis'

AMD's mobile Yukon platform will not be targeted at emerging true portables, leaving the market to the likes of Via, Intel and system-on-a-chip vendors such as Qualcomm (see above).

The chipmaker originally told analysts it would target Yukon at mini-notebooks, but subsequently informed US magazine *Information Week* that the chip would be aimed at "larger minis", with screens from 11in to 13in and weighing between 1.36kg and 2.27kg, which is getting into the luggable class.

The Yukon's single-core chip, codenamed Huron, is said to have exceptional battery life and is due to launch early next year.

AMD aims to launch three notebook platforms next year: single and dual-core versions for ultraportables, and one called Tigris for larger models.

It is also developing a 32nm processor codenamed Ontario, with onboard graphics, for 2011.

AMD roadmap... for ultraportables read luggable

Software is tuned up for ARM

Chip designer ARM has made two deals in the past month to ensure that emerging mobile internet devices using its architecture have access to mature software.

ARM is working with Canonical, UK commercial sponsor of Ubuntu Linux, to optimise power management and multimedia processing for the operating system.

Simon Hickman, ARM's regional mobile computing manager, said there had never before been a full ARM implementation of Linux.

"But we have been working for a long time with Debian, on which Ubuntu is based," he said

ARM-based machines launching next year will use a variant of Ubuntu 9.4, which is due for release in April, and will come with the Microsoft-compatible Openoffice.org suite.

ARM is also collaborating with Adobe to optimise Flash Player 10 and AIR technologies for the platform. Flash works within browsers, and AIR runs native on the client devices, to provide a range of text handling and other rich-media facilities.

The new software will be available on devices using ARM's ARM11 and Cortex cores, which are expected to appear in products next year.

Gary Kovacs, mobile and devices general manager at Adobe, said the collaboration with ARM would "help make browsing and applications as rich and powerful in mobile as they are on the desktop".

A Flash player has already been developed for Apple's iPhone, which includes ARM technology, although it has not been endorsed by Apple boss Steve Jobs.

Google Docs makes little headway against MS Word

Microsoft Office is holding its own against free online applications, according to a survey of more than 2,400 US internet users by data-collection agency Clickstream.

It found that more than half still used Microsoft Word, compared with just one per cent using the free Google Docs app and five per cent using the open-source Openoffice suite, only a quarter of whom also used Word.

"Although Google Docs and Spreadsheets has been touted as a potential competitor to Microsoft Office, Openoffice is currently the more likely app to take that position," the survey concluded.

Ironically, the survey appeared just as Microsoft launched its own Software-as-a-service (SaaS) package. Exchange and Office Sharepoint has gone live online in the US, and will be available in the UK next spring.

Microsoft UK Office marketing manager Gill Le Fevre said that Microsoft expected 50 per cent of its business customers to be using email via SaaS in five years' time.

Google Docs is used by just one per cent of US internet users

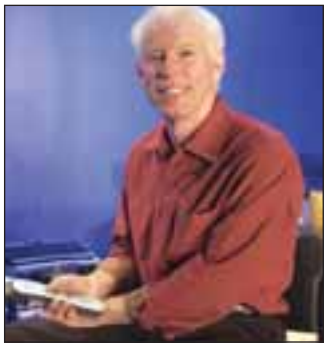
More egg on faces over Vista Capable

More embarrassing emails have emerged from the class action against Microsoft claiming that machines labelled as "Vista Capable" could not run all features of the operating system.

The Vista Capable logo was used on PCs sold in the run-up to the launch of the operating system to forestall a sales blip. But it later emerged that many PCs with the logo could only run the limited Home Basic version of Vista.

Microsoft chief executive Steve Ballmer was ordered to appear before Judge Marsha Pechman, despite pleading that he had nothing to do with the case.

But more embarrassing are emails showing that HP, one of Microsoft's biggest customers, was incensed by the retraction of a requirement that Vista Capable machines should support the Windows Display Driver Model (WDDM), necessary for advanced interface features.



Allchin: "I am beyond upset"

Richard Walker, senior vice-president at HP's consumer PC unit, wrote that his company had spent considerable time and money making sure systems were WDDM-compatible.

"I hope this incident isn't a foretaste of the relationship I will have with Microsoft going forward, but I can tell you that it's left a very bad taste with me and my team," Walker wrote.

Jim Allchin, a key player in the Microsoft campaign, wrote: "I am beyond upset here. This was totally mismanaged. What a mess. Now we have an upset partner, Microsoft without credibility, and my own credibility shot."

Mathematica 7 gets the picture

The interface of the Mathematica maths package looks like a cross between a word processor and a calculator capable of almost every mathematical operation.

Mathematica 7 allows users to paste a picture into a line of code for treatment as a data set.

Wolfram Research's program can be used for Photoshop-like manipulation but is also a powerful tool for analysis of scientific images. Mathematica 7 has more than 500 new functions.

Simple cuts cost

Amazon has moved its SimpleDB online database service out of beta and reduced the cost of data storage from $1.50 to $0.25 per gigabyte per month.

The Simple Database Explorer interface, available as a 30-day free trial, allows MySQL data to be uploaded into SimpleDB, which forms part of Amazon Web Services.

→ **www.pcw.co.uk/2231751**

IE8 new dawn

Internet Explorer 8 will be released in the first half of 2009 after going through its final beta stages early in 2009, Microsoft has announced.

The company hopes the new version will help it shed its reputation for not co-operating with other vendors. Microsoft has said that the new browser is firmly rooted in web standards such as Ajax and CSS and will have new, improved security features.

→ **www.pcw.co.uk/2231004**

Windows blues

Microsoft has launched 63 lawsuits globally, including seven in Britain, against alleged software pirates. A particular concern is an XP bootleg called Windows Blue Edition

→ **www.pcw.co.uk/2232038**

INTERACTIVE

IN THIS SECTION

18 LETTERS

OPINION
21 Gordon Laing
22 Barry Fox
24 Guy Kewney

LETTERS

→ **Send your letters to** The Editor, *PCW*, Incisive Media, 32-34 Broadwick Street, London, W1A 2HG **Send your email to** letters@pcw.co.uk

LETTER OF THE MONTH

Death of the cover disc?

Does the time approach for the death of the cover disc? I have been a reader of PCW for more than 25 years and have fond memories of getting magazines just because they had the latest utility, upgrade or game demo I wanted to try.

With the advent of widespread broadband use, both mobile and fixed, and the software tools to allow management of downloads, should we call an end to issuing magazines with cover discs?

Everything is accessible on the internet for easy or automatic download and perhaps it would be better to dedicate a page of useful links to software than go to the expense of producing magazines with CDs and DVDs attached.

The most cost-effective approach would surely be to abandon the cover disc and pass this saving on to the customer. With the credit crunch, this could be the difference between buying the magazine or not for some people.

Tom Burnett

Has the cover disc had its day?

Nigel Whitfield replies: Our reader research indicates that for many people, a cover disc is still a useful way of gaining access to important programs, without the hassle of searching the web. Even with broadband it's still useful to have essential tools such as anti-virus software or diagnostics tools to hand on a disc, especially when you're faced with a broken PC, or a download cap.

FIVE ON FREESAT

I was absolutely appalled when I read the competition page in the January 2009 issue (the prize was a Humax Foxsat-HDR Freesat PVR). In the second paragraph you said that "Freesat gives you access to all terrestrial channels".

It most certainly does not! Channel 5 is not available, yet this is the very channel that is generally distributed at lower transmitted strengths than others terrestrially, and is the one for which most people are delaying purchase of Freesat equipment.

I trust you will apologise for your highly misleading statement in the next edition.

Bill Rawcliffe

Nigel Whitfield replies: In fact, though the Freesat website has been a bit late in being updated, Channel 5 joined the Freesat Electronic Programming Guide on 18 November 2008, so all the traditional terrestrial channels are now available via satellite, without a subscription or card being required.

Freesat now includes Channel 5, though not its sister stations

QUALITY OF SERVICE

I read in the July issue of *PCW* your article regarding the inadequate help from AOL. I can say that AOL is not alone. I have had similar email 'help' from Pipex, in stilted English, not giving a sensible answer (or any answer at all). They give the impression they are selected from a database of ready-made answers in the hope they may be relevant.

Even BT provides some of its support from abroad.

Ofcom doesn't seem to be in the least concerned about the situation: it has "no regulatory

control over the quality of customer service. However, all complaints we receive are formally recorded under relevant categories against the particular service provider". All very reassuring, I'm sure.

I asked Ofcom why ISPs don't offer a firm download speed that they can provide before we have to sign up. This was their answer: "Ofcom has introduced a new Code of Practice that will encourage service providers to be much clearer when they present information on speeds to their new customers." I signed up for a 2Mbit service, which "could only be connected at 1Mbit" and frequently runs at little more than dial-up speed.

Overall, it seems that once the ISPs have got your money they are not interested and make it impossible to get in touch with a human being.

Bryan Percival

ONLINE PERILS

I have heard through your magazine and other sources the issue of home PCs being hijacked and used as servers for nefarious purposes, and this seriously worries me.

Some people have been arrested and charged with using their PCs for pornographic purposes which they strongly deny but can't prove.

I use Windows XP Home Edition and have a broadband link with BT. I use Panda Internet Security Suite 2009, Auslogic, Cyberscrub and do my best to keep my PC clean with regular clean-ups.

How can I tell if my PC is being used in this manner and how can it be prevented? What steps need to be taken to prevent this from happening?

Les Finch

Nigel Whitfield replies: Fortunately, it's still very rare for people to have their computer compromised to the extent that it causes them legal problems, and you're doing all the right things. Run up-to-date security software, including a firewall and virus checker, and consider a broadband router that also includes a firewall too, as well as keeping your system up to date. Good-quality security tools will soon alert you if your security has been compromised.

With the Mac's increasing popularity, should PCW have a dedicated section?

BOXING NOT CLEVER

I have just bought a copy of Nero 9 and was surprised to find it delivered in a cornflakes-size box. Like cornflakes, the box was mostly air and contained only the ubiquitous DVD clamshell-style case. I calculated the software took up 15% of the box, so 85% of the packaging was wasted.

I know software vendors have to compete for shelf space, but I bought the product from Amazon. Besides, I have seen it on the shelves at PC World in a much smaller box. It can be done.

Nero claims over 300 million units in worldwide use, so reducing profligate packaging would make economic sense as well as help to save the planet.

Anthony Beken

KILLER APPS

I wonder what replies you would get if you asked people "What software on your computer is most important to you?"

There are three things that keep me from using my Linux boxes more. One of them is Shortkeys. It is the answer to Windows users' frequently used text needs. It works across all of Windows, not just within the Office applications.

The other two must-have apps? Textpad, with which I do all my web publishing, and Pegasus, my email client. It allows me to fetch headers first and then delete junk from the server without ever downloading it, but fetch (Pop or, I think, Imap) things I do want.

Tom Boyd

MORE MAC ATTENTION

I've been a long-term subscriber of *PCW* and have thoroughly enjoyed the incisive articles, help, support, advice and ideas on offer, particularly across a variety of personal computing platforms, accepting that a PC running a Microsoft OS has been, and likely continues to be for a while at least, the dominant format.

However, I recently replaced my ageing Dell laptop with Windows XP on it and took a slight leap of faith and bought an Apple Macbook Pro. My reasons for this were partly design indulgence and quality of build, but also my interest to learn and use Mac OSX – having played around with Linux and more recently FreeBSD-based systems.

I'm so pleased I chose to do this because, for a variety of reasons, it has been a breath of fresh air. I have the convenience of true terminal access to my machine, combined with a fantastic GUI, which, unlike Windows and until recently many Linux distros, 'just works'. In addition, through virtualisation using VMware Fusion I can have the one or two apps I still need from my old Windows laptop available on my desktop running faster than they did on the old machine.

I realise there are plenty of reasons many would want to stick with Windows-based PCs (not least the extremely high cost of Apple hardware), but my experience has been so painless I think many will be following this way. Given that, perhaps it is time *PCW* had a dedicated column on OSX in the same way it does for Barry Shilliday's excellent Linux column.

Tom Clements

WIN Next month's prize for the letter of the month is a Logitech Audiohub

The Audiohub provides premium audio in a compact notebook station. The space-saving design combines a powered three-port USB2 hub with a 15W speaker system featuring high excursion drivers and an innovative three-chamber design with integrated subwoofer.

With a telescopic body and webcam stand, it can be adjusted to suit most laptops and monitors, and the USB audio support can give a welcome boost to the sound capabilities of many portables.

For more information on the Audiohub and other Logitech products, visit **www.logitech.com**.

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Gordon Laing

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The trouble with speed tests

Don't rely on raw benchmarks to flag the best setup for your system. Test it with the applications you actually use

PC performance can be a funny thing. Many systems race through general tasks, making you question the need for ever faster parts, and then grind to such an agonising crawl on others that you wander off and fix yourself a drink, or even a meal.

One of the toughest modern applications is video editing, which gives your entire system a workout. Processors, memory and even graphics chipsets often max out when rendering effects and converting formats, while hard disks are hammered in capturing and editing clips or writing the finished project.

Over the years I've found myself doing more and more video editing. It's now by far the most demanding task for my PC. I can live with the delays of a final render as it's something you can walk away from. But unresponsiveness while editing can be infuriating. As you drag the timeline slider back and forth you want to see your frame rendered on-screen in real-time, as any delays make precise edits and nudging back and forth very difficult.

'Should I trade in good all-round Raid 5 for the extra speed but extra risk of Raid 0?'

While most hard disks deliver smooth performance with a single video stream, they have problems reading two or more simultaneously. Transitions, voiceovers and picture-in-picture effects all involve the I/O system reading multiple files from different areas of your hard disk at the same time – and with video we're talking hefty sizes at high bit-rates.

To improve I/O performance, serious video editors exploit Raid, which uses two or more disks working together. Raid 0 is the most popular for video as it stripes data across multiple disks to improve speed. Should one disk fail, you lose the entire array, so Raid 0 is only suitable as a temporary work area before shifting finished projects to a safer location.

In contrast, Raid 1 mirrors data across pairs of disks, so if one fails, the other seamlessly takes over. However, you only get to use half your total storage space.

It was these reasons which drew me to Raid 5, which uses three or more disks to protect against failure, but makes more efficient use of space – you only lose one disk's worth. The downside to Raid 5 is poor write speeds, but a hardware accelerated controller can do wonders. Which is how I ended up with a triplet of 300GB disks hosted as a Raid 5 array on an accelerated Promise controller.

I used it to store my documents, emails and photos, but over time it also became the working area for video projects. Standard benchmarks like HD Tach showed that while it wasn't as quick as Raid 0, it still delivered better performance than a single disk.

I'd been happy with this arrangement, but when recently upgrading with three 500GB drives, I took the opportunity to run additional tests to see if Raid 5 was still my best bet. I still used HD Tach for pure benchmarks, but also copied the files from my latest video project onto each test array and checked responsiveness and final render times.

As before, HD Tach confirmed Raid 0 as the fastest overall, although accelerated Raid 5 ranked fairly close in some respects. But Raid 0 was significantly better when using Adobe's Premiere video-editing software: almost a third faster in render time, and giving a much snappier response when editing. This is what I was really after, but it put me in a quandary: should I stick with the good all-round Raid 5, or trade it in for the extra speed but extra risk of Raid 0?

In the end I decided to go for the best of both worlds and built two arrays: the new disks in a reliable Raid 5 volume, and the older ones reconfigured as a quick Raid 0 work area. I'm looking into a switch to power up only the Raid 0 array when required.

The important lesson in this process is that when upgrading or rebuilding, don't rely solely on raw benchmarks or what's worked for you in the past. Run tests with your most demanding current applications and latest files to see which configurations will perform best for you right now. This process ensured I got the best setup for my current requirements. You can find out more in next month's Hands On Hardware. **PCW**

Barry Fox

barryf@pcw.co.uk

How I saw red when the light went out

A new projector bulb can cost almost as much as the machine itself, which is why it pays to read your warranty's small print

If you are buying a projector, be sure to check the small print on lamp life. Around 18 months ago a close relative bought a Dell projector for £414. It came bundled with a £64 screen so the true price of the projector was around £350. The pictures were very bright: too bright, I thought. But the projector came with a 'two-year next business day exchange' warranty.

The lamp failed after 13 months of moderate use. Phone calls and correspondence with Dell's support in India repeatedly produced the same parroted rejection: the two-year warranty did not apply to the lamp because it excluded consumables 'such as toner in printer cartridges'.

The price of a DIY plug-in replacement lamp was more than £238 – about two-thirds the cost of the projector.

The projector has a meter that records hours of lamp usage and so could let a customer prove moderate use. But the meter could not be read without a replacement lamp.

'Now I'd gone to court, Dell finally seemed interested in reading what I had written'

I suspected that the projector had been feeding too high a voltage to the lamp, either by design to make the picture look brighter, or by accident because of a fault. Dell expressed no surprise or concern over the lamp's failure and never asked to inspect the projector. "Take us to court, and you will lose," said one of the helpdesk staff.

Is it reasonable to equate a £238 lamp with a £30 toner cartridge, and to have to pay around £200 a year for moderate use?

I wrote a recorded delivery letter to Michael Lombardo, vice-president and general manager of Dell Europe, warning that I intended to go to court and publicly air the matter by arguing under the Sale of Goods Act 1979 that the projector was not of quality that a reasonable person would regard as satisfactory, fit for purpose, free from defects, and durable.

I gave Mr Lombardo a full statement of the facts that Dell's support in India had already had many times, and suggested he alert the company's lawyers and press office.

Mr Lombardo did not reply. What I got was more phone calls and emails from India, repeating the rejection and thanking me for "taking the time to make us aware of your experience".

It added: "We pride ourselves in the level of service we deliver and take matters such as this very seriously (and) we are constantly looking for ways to improve our standards of service and support, and any feedback we receive which helps us achieve this is most welcome."

One email was addressed to someone else, apparently also complaining about lamp failure.

Dell also pointed to what looked like a new and clearer retroactive refusal to guarantee a projector lamp for more than 90 days.

So I followed through and spent the £25 it costs to file a faulty goods claim in the county court (**www.moneyclaim.gov.uk/csmco/login_get_started.jsp**) for the cost of a new lamp plus the court fee.

Almost immediately Dell's legal department phoned to ask me for the background information I had already supplied to bossman Lombardo. Now I'd gone to court, Dell finally seemed interested in reading what I had written. Almost immediately it offered to settle by collecting the faulty "computer" and sending a cheque for the full amount claimed. I accepted, but noted that I did not agree to keep the matter confidential.

The Sale of Goods Act is a powerful tool. But you will need to prepare a clear case and give the company every opportunity to settle before filing a court claim. Don't make unreasonable claims: you will come unstuck if you do have to go to court. And even though the court process is reasonably informal you may well face a grilling by a tough lawyer.

I have no idea whether the court would have upheld my claim, but I was prepared to put it to the test. Dell obviously wasn't.

I certainly do not want to go through such a hugely time-wasting pantomime again if a lamp with a £238 replacement price tag fails after 90 days. So the legal winnings will be going towards a new projector with a more generous warranty on the lamp: an Infocus with a one-year or an Epson with a three-year, for instance, but most definitely not a Dell or a Panasonic with a measly three months. **PCW**

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Get your head out of the clouds

Cloud computing will probably kill off the PC – eventually. But there's still life in the old dog yet

It takes a certain sort of courage to stand up and say, "I was the chap who refused to take [Linux developer] Red Hat public in the last recession." This was a particularly famous boo-boo by Tom Bergquist, who is now chief executive of Ingres. But he tells the tale against himself and plans to learn the important lesson, which he says is that open-source software will triumph in the enterprise to the extent of killing off database giant Oracle.

This may sound like fantasy coming from an executive of Ingres, which has been a less successful rival to Oracle for years. But the argument goes that the future of enterprise software lies in cloud computing, where proprietary software will struggle to compete.

Clouds are supposedly new and brash and very Web 2.0, but in reality they are just the old-fashioned computer service bureau writ modern.

'To flourish as a Cloud provider, you should be 10 times the size of your largest customer'

Back in the 1960s and 1970s, nobody could afford a computer big enough to do all the work they wanted it to do. Even if they could they would only occasionally need peak capacity, so it would sit around idle for most of the month. There was a successful business in buying huge mainframes to do jobbing computer work, mostly payroll, for big customers.

Cloud computing is much the same, only on the internet and more interactive. You create a huge resource and advertise to people who can't afford that all the time, but do need it some of the time. You charge them by transaction.

There's a simple problem with this business model, and a rather less simple one. The simple one: you have to spend most of your computing energy working out how much to charge. At one stage in the 1970s, a big bureau chief confessed to me that 95 per cent of his CPU cycles were devoted to billing. The less simple problem is more fun. It has to do with size. Here's how it works: you buy, say, 1,000 big, powerful multi-core servers, bury them in a cold room somewhere and connect them to the internet. Then you set up your software. For fun, we'll imagine this is a system that allows your customers to run a casino – random number generators, credit management, graphics image display, and so on. Sign here, and you too can have Cloud Bingo and Cloud Chemin de Fer, and your customers will make you wealthy.

As long as your customers are all small-time sharks, you can gradually add to your server farm. Buy another 10 here, another 20 there, as your customer numbers rise and there's always enough processor capacity to handle them all.

Where it goes wrong is when Megabet (I made that up) decides this is the way to go and signs up. It quickly becomes apparent that Megabet is a $100m business. You, while very pleased with progress so far, are still only a $50m outfit. What happens when Megabet doubles its turnover? "The capital expenditure," says Tom Bergquist succinctly, "will kill you."

To flourish as a cloud provider, you should be 10 times the size of your largest customer. So as soon as the biggest casino signs up, you have to be a billion dollar business to be able to raise enough money to expand.

BT ran into a similar problem with its work for the NHS. As one insider explained, it provided enough equipment to cope with the number of transactions the biggest IT user in Europe wanted to process. And then, because there were problems in actually making the system work, they didn't see that much traffic and so didn't make that much money, and now they're having to re-think the size of the operation.

The moral is that Ingres and its partner Red Hat should be taken seriously when they bang on about clouds, which will some day become a major way of handling IT. In the next five years, recession or not, you will be reading a lot about cloud computing. But if you expect it to be even half the IT provision available in a decade, you're being optimistic. Bergquist reckons it will take 20 years for cloud computing to become "the major way of providing computing resources".

"The PC is dead," he says, and he may be right. But if you go near its moribund body, you can still expect to be wiped out by the thrashing of its tail. It will be a long time actually dying. **PCW**

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101 FREE WINDOWS PROGRAMS

Finding good free software can be a chore, so as a New Year treat Chris Wiles has done the legwork for you and rounded up 168 of the best programs around

It's not that long ago that it was reasonably safe to find new websites, download interesting software from them and install it on your computer. But these days, the added risk of spyware, malicious software and fake websites gives real cause for concern. It's often safer to stick with what you know rather than take a chance on a potentially dodgy program of unknown provenance.

For this reason, we've used our expertise in the software market to source, test and provide you with our pick of some of the very best free tools out there. On the DVD edition of *PCW*, the Resources section includes 12 different categories and more than 160 free applications. For those who've bought the CD edition, we've squeezed as many of these tools on your CD as we possibly could, giving you 103 free applications in eight categories.

Finding the Resources section is relatively easy. Either put your disc in your drive and click on the Resources tab at the top of the disc interface or, if you prefer to browse your files through Windows Explorer, simply locate the Software/Resources folder and then the relevant sub-folders.

In the following pages we'll highlight some of the very best of the best, and you'll find a full index to the entire collection in the table starting on page 33.

If you've bought the CD edition of *PCW* and there's a particular program you want that's not included on the disc, don't despair. All the programs can be found on the PCW Downloads site at **www.pcw.co.uk/downloads**, and you can also find the full collection of 168 programs on future DVD editions of *PCW*.

AUDIO, VIDEO & PHOTO

Whether you want to manage your photos, edit your MP3 audio files or produce a home movie, this section should contain the tools you require.

Audacity 1.3.5

It may be really easy to go to any online digital audio store, purchase music and download it. However, many of your favourite tracks may not be available online. Typical examples include rare live tracks, bootleg vinyl from the 1980s and tapes you recorded off the radio when you were a kid. Your quest will be to get these tracks onto your computer.

The recording part of the process is relatively easy. The problem is that the recorded track will be a mess: hiss from the old tape, the DJ talking over the intro and the track merging into the following track are typical problems. Audacity and Wavosaur, both included within the Resources section, will enable you to edit, enhance and export recorded audio tracks so that they are suitable for your MP3 player. Import the track, cut off the unnecessary parts, fade out the audio and use the various effects to enhance the sound.

K-Lite Codec Pack 4.3.1

Modern video tracks are expected to play across media players, irrespective of the source. You can often view MPEG movies in Quicktime or Real Player, for example. Modern standards are limited to various key codecs supported by most of the top three media players. But what happens if you want to play one of the many encoded audio or video tracks from the 1990s, or a track encoded specifically for the Mac?

The K-Lite Codec Pack includes a host of different audio and video codecs to enable your PC to play and convert old or non-standard media.

BACKUP & RESTORE

Before you install any software, you should always back up your most important information, data and work files. We've included various tools on the disc that will enable you to back up individual files or your entire drive or drive partition.

Easeus Disk Copy 2.3

Rather than buy a new computer, it's often cheaper to upgrade the components of an existing PC. You might decide to add more memory, for example, or add to or upgrade your hard drive.

If you choose to upgrade your hard drive, then you'll want to copy the existing data on your system across to the new drive. You can do this by connecting the new drive as a temporary slave on the same cable that is used to control your existing drive.

Once connected, reboot your computer and start up some disk copying software, such as the free Easeus Disk Copy. This tool will enable you to clone your entire drive quickly – including all the partitions – or just a drive partition to a new drive. For example, you may want to copy an existing media partition that holds all your audio and video files. Easeus Disk Copy will make a 1:1 copy of the existing data. Then you just disconnect the new drive, remove the old drive, connect your new drive and reboot your computer. You'll find that all the data is safely in place on the new drive.

Paragon Partition Manager 9 Express

Go out and buy a new PC and you'll find it comes with a huge hard drive that's either preconfigured as one large block or as multiple small partitions that the manufacturer has deemed suitable for users. Likewise, if you buy a large new hard drive, you'll need to format and then partition the drive.

Sadly, Windows does not come with easy-to-use partitioning software, so if you want to delete or resize partitions, you'll need to seek alternative software. Luckily Paragon has decided to release a free version of its partitioning software for home users. Paragon Partition Manager 9 Express will enable you to perform all your basic partitioning requirements, from creating a partition to deleting existing partitions and resizing small partitions to add space.

We suggest you back up any important drive or drive partition using our recommended drive backup software before you partition.

Use Syncplicity's secure data storage to back up your files

Syncplicity

Purchase digital audio files from an online store and you get a once-only chance to download. For this reason, these will be some of the most important files on your system and you need to back them up. Most backup tools, such as the free Cobian Backup that you'll find in your Resources, will enable you to select the files you want to back up and then a location (disc, external drive, internet) to back them up to. If you need to restore any of the backed up files, you just reverse this process.

We've included Syncplicity within your Resources, preferring it over Sugarsync (a commercial app), Dropbox and even Windows Live Foldershare. Syncplicity will let you back up files in a secure area on Syncplicity's servers. The free basic edition gives you access to 2GB of space for data storage and enables you to synchronise files across two machines.

The advantages of Syncplicity are obvious and you'll soon welcome our choice. As well as basic file backup and restoration, you can synchronise your files across computers, whether you own a PC or Mac. Files stored in your PC's My Documents folder are then found in your Mac's Documents folder and vice versa. You can access your files through any web browser, on any host PC. And that means you can individually download an important file, rather than synchronise your data on someone else's PC.

Paragon Partition Manager Express will let you schedule a backup at the end of every week or day

BROWSERS, MANAGERS & EXTENSIONS

Only a few years ago most people used a web browser such as Netscape rather than Internet Explorer. But since Explorer has been included with Windows, lots of people use it as their default web browser for no reason other than convenience. For those who fancy a change, the disc has a selection of web browsers, extensions and add-ons.

Foxmarks 2.6

If you spend any time updating your bookmarks, you'll want access to them across all the computers you use, whether at work or home. Take a laptop on the road, and you'll be lost without your favourite bookmarks. Move across to another computer, and the first thing you'll want to do is work through your sites to see if they have been updated.

How do you manually make sure your bookmarks are the same across every edition of Firefox? One option is the official Mozilla Weave extension, which we've included in the Resources section of the disc.

Another option is Foxmarks, which is an unofficial but popular synchronisation tool that will enable you to make sure you have the same bookmarks on each edition of Firefox, irrespective of the operating system or location. Better still, if you have to work on a temporary computer, you can still access your bookmarks via any web browser, as long as you can remember your Foxmarks login and password.

Mozilla Firefox 3

Mozilla Firefox is a free web browser that has been developed by a group of individuals who spend their time expanding its features and releasing security updates. Firefox is arguably the most popular web browser around after Internet Explorer. Unlike Internet Explorer, a new version is released every couple of months.

Why would you choose Firefox over Internet Explorer? One key reason has to be the wealth of extensions and add-ons made available for Firefox by other web developers. There are extensions for everything from locating an address via Google Earth to synchronising your bookmarks across different versions of Firefox, whether installed on Windows, Mac or Linux. And that's another reason to choose Firefox: if you're keen on using a Mac, the browser operates as it does under Windows. It's the same rendering engine, bookmarks manager and user interface. ↘

BURNING & MEDIA

If you want to burn a data or audio disc quickly, we have a solution in this section, along with tools for opening, creating and extracting ISO images.

Left: Distribute content as ISO image files rather than discs by using ImgBurn

Right: Digsby is an instant messaging client with social networking tools

ImgBurn 2.4.2

There aren't too many methods of providing disc content to other users so that they can quickly use your work without having to try and open your archive or understand your files.

One underused but ingenious option is to simply burn your disc as an ISO image and then distribute the ISO as a downloadable file that people can access at will.

Say you create your own bootable movie DVD and want to send it to your friends and family. You could make copies and post them, but the postal service takes time to deliver. By creating an ISO of the content and then providing it as a download on your home page, you make it available instantly. ImgBurn is a free tool that you can use to create an ISO image, open ISOs and burn them to disc.

BUSINESS, OFFICE & COLLABORATION

In this section you can find yourself a free office applications suite, such as OpenOffice or Lotus Symphony. Other highlights of the section include PDF creation and team-working applications.

Chandler 1.0.2

As most people work in teams, it's a wise idea to share information about meetings, tasks and what's happening on days when we plan to be out of the office. The problem is that, unless you're using Microsoft Outlook within a Microsoft Exchange environment, there are only a few tools that you can use to create a calendar and share that information between users.

One of those few is Chandler, a free program that lets you store your to-do tasks and forthcoming meetings and share them with other users. You can create a group calendar with multiple users that enables more than one person to include their meeting and other information.

Better still, Chandler is a cross-platform tool, so if your team contains both Windows and Mac users, then you can all work with the same calendar.

Above: Cross-platform tool Chandler lets users share work calendars and to-do lists

doPDF 6.1

If you want to provide a document or formatted information to users via the web, then there are few alternatives to an Adobe PDF file. The advantage of a PDF is that it retains all the fonts, images and layout of the original document, irrespective of the source. Anyone opening the PDF will view the document exactly as it appeared within the application used to create the work.

And if it's a high-quality PDF, you can even give it to a commercial printer and they will be able to replicate the document perfectly, without the original fonts.

doPDF is a free tool that you can use on your PC to produce a PDF document from just about any Windows application. You simply 'print' your document to doPDF rather than your normal printer, and it generates a PDF. You can then give the PDF to any computer user to view on their PC, irrespective of operating system.

Below: You can even assign alarms to your stickies with PNotes

PNotes 4

How many people have those yellow sticky notes plastered all across their monitor? The problem, though, is that they lose their stickiness over time and, if they fall off the monitor, they simply get binned or disappear up the vacuum cleaner. That's not good if you've used the note to write down an important task or even the phone number of a key contact.

The alternative is to place digital sticky notes on your desktop. PNotes lets you create as many notes as you want, allocating a colour to each. With tasks-based notes, you can even assign an alarm as well to warn you when a task is forthcoming or due. You can also 'skin' your notes and customise them to your requirements. You can open and close the notes whenever you want, keeping all your important notes and information safe.

CHAT & COMMUNICATION

Here we've gathered tools to help you keep in touch with other people at home and work, irrespective of their network or location.

Digsby

Keeping in contact with old friends and family members seems more important than ever. But if they use a different communication network than you, you have to switch or lose contact – unless you have a cross-network chat tool such as Digsby.

Digsby lets you keep in contact with other users on different social networks, email and instant messaging services. It supports users from Windows Live Messenger, AOL, Yahoo, ICQ, Facebook and others. You can also use Digsby to check your email, whether it's Google Mail or regular POP-based email, and receive a notification when any new mail message arrives.

The only downside is that Digsby doesn't support Skype users as Skype won't provide network information to other providers. We've included Skype within your Resources, though, as it's the primary choice of messenger for office users.

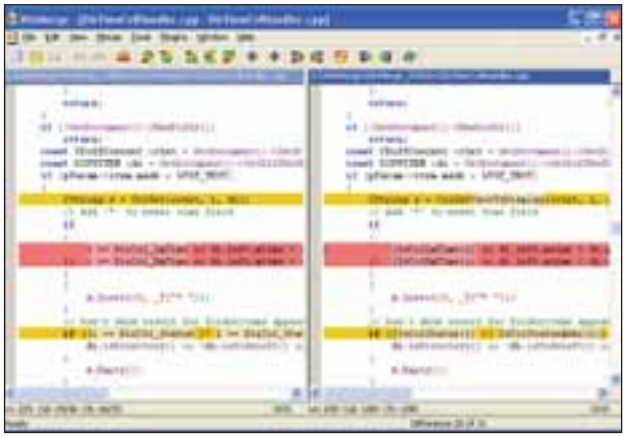
DEVELOPER & WEB DEVELOPMENT TOOLS

For anyone creating or maintaining a website, this section of the disc contains a valuable collection of tools for editing, producing and managing web code.

WinMerge 2.10.2

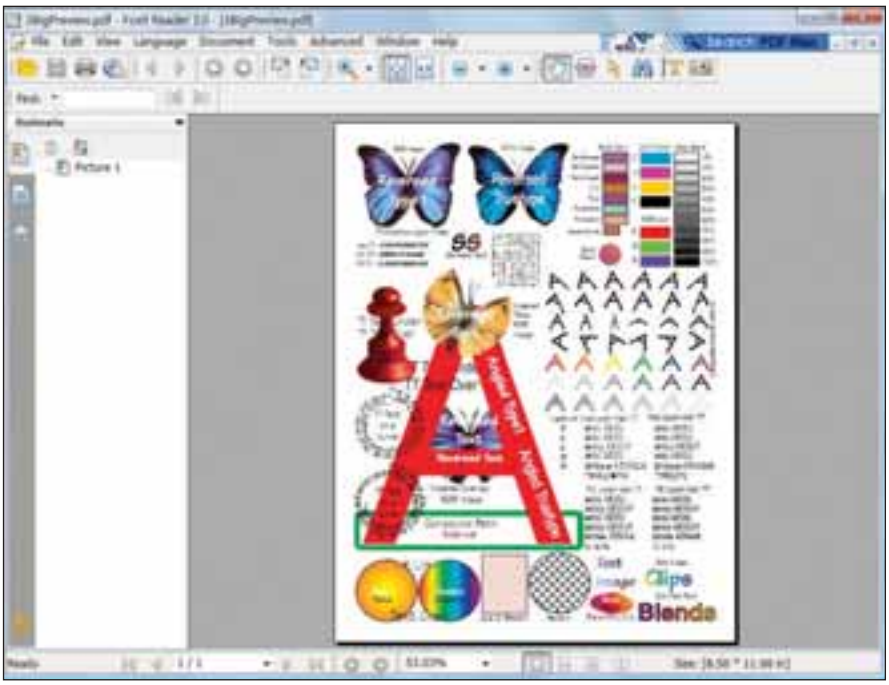
Because many work teams are located in different buildings or across continents, more than one person may want to work on the same document at any time. While you may be fixing bugs, another user might be adding new ones. If it's a contract, you may be removing information while another user is changing the words from the existing contract.

Either way, it may take you longer to work out what they did, added or removed than it did for you to create the original document. The solution is WinMerge, which will enable you to open two documents and compare the contents side by side. You can quickly see what's been added or removed and move data across from one document to the other.



Find changes to files quickly and easily with WinMerge

CrossLoop is a secure screen sharer that lets users collaborate to solve problems



GENERAL UTILITIES

This category includes those miscellaneous but important tools that do not fit within the other categories, but should nevertheless be part of any PC user's software toolkit.

Desktops 1.0

With two monitors, you have the luxury of being able to park different applications full screen on their own monitor, and just move between monitors to edit your work. But you can pull off the same trick with just one monitor. Microsoft Desktops 1.0 is a free tool that lets you open up to four virtual desktops on your PC. This means you could have one desktop for your email, another for your web browser and a third for your work. Assign a keyboard shortcut and you can quickly move from one desktop to another.

Foxit Reader 3

PDFs are a great way of displaying content irrespective of operating system. Create a PDF from Microsoft Word 2007 on your PC and you can guarantee that it can be viewed on a Mac or other non-Windows computer.

However, most users install Adobe Reader simply to view PDF files, and Adobe Reader takes a huge amount of system resources. The free Foxit Reader 3 is a far more system-friendly reader that also lets you annotate PDFs if you need to make comments for other users.

INTERNET, NETWORKING & WIFI TOOLS

If you want to manage a network more effectively, stay connected to a Wifi network and log in to a remote computer, this is the section for you.

CrossLoop 2.3

Novice computer users can find it frustrating trying to learn from books or using

Foxit Reader will let you read and annotate PDFs without sacrificing lots of system resources

information from the internet. It's far easier asking a friend round to show you how to understand an application or technique. Unfortunately, it's not always possible to get practical help.

One solution is CrossLoop, which is a free tool you can use to enable other users to access your computer to show you how to perform certain functions. It's also possible to use CrossLoop to provide help for other users and for you to make a living from doing so. If you're an avid photographer, for example, you could use your skills to show other users how to get the most from their photos.

zFTP Server 3

It may seem like serious geek territory, but just about anyone can run a web server. In some respects, it's actually easier to set up your own server than to put a website online. Setting up an FTP server is the easiest way of providing files to other users. If you have a fast broadband connection, you could even set up your FTP server on your computer, then assign a domain (such as yourdomain.co.uk) through a dynamic service, such as **www.dyndns.org**.

zFTP Server 3 is one of the best free FTP servers around. It's easy to install and will enable you to set up open or secure areas where other users can access files either on your computer or a remote server. If you use a remote desktop tool, you can see who is connected to your FTP server and configure accounts, monitor usage, compile statistics and even kick users off the site if they are hogging bandwidth.

Auslogics Disk Defrag boosts performance by reuniting data

Portable Bookmarks lets you carry your list of favourite web pages around in your pocket

OPTIMISATION & DIAGNOSTICS

These indispensable system tools will help you boost the speed of your computer, keep your PC trouble-free and help you diagnose many other problems. Other highlights in this category include Autoruns, which will check the applications that start with your computer and enable you to remove or disable those you don't want. CCleaner will cleanse and remove unnecessary files on your PC, while Revo Uninstaller will perform a deep clean when removing software from your computer.

Auslogics Disk Defrag 1.5.19

Buy and install a new hard drive for your PC and it will feel like a speed demon. But after a few months of installing and removing software from the machine, and accessing and saving data to the drive, your computer can slow down considerably. One solution is to defragment the hard drive. The free Auslogics Disk Defrag is a great solution for this. If you leave Auslogics Disk Defrag running overnight it will rearrange your files more efficiently, allowing your system to load applications more swiftly and boot a great deal faster.

Eusing Free Registry Cleaner 2.0

After you buy a new PC, the first task you'll want to perform is to install your favourite applications and use the opportunity to test out other new software. However, even when you remove these applications from your system, a lot of the information stays in the Registry and slows down performance. For example, your system's attempt to load a non-existent tool may result in a pause when you boot your PC.

The solution is to run a tool such as Eusing Free Registry Cleaner, which will examine your Registry and remove unnecessary information. Remember to back up your Registry before you use it, though.

SUMo 2.3

Install software or drivers on your computer and they may interfere with other applications. Most software developers react to user feedback and update their programs swiftly. However, you may not realise there is a new update to an installed application and you won't have the time to go through every tool manually checking for a new release. SUMo is a free tool that examines the programs installed on your PC to see if there are updates for them. If there are, it will inform you so you can download them.

PORTABLE APPLICATIONS

Carrying your applications around in your pocket is something more and more people are realising they can do. This section offers a great choice of tools to enable you to take your work on the road.

Portable Bookmarks 2.1

Work away from your main computer and you'll want to access your favourite bookmarks, if only because they store the login information for accessing various online accounts, such as your home page or company intranet.

Portable Bookmarks is an application that stores your bookmarks and lets you open them on another browser on a host PC without storing them locally. Combine this with KeePass, also within the portable section, and you'll be able to take your bookmarks and secure login info on the road.

SECURITY

Sandboxie 3.22

Unless you want to test software within a virtual environment (and if you do, you'll need another copy of Windows, which can be costly if you only want to test software), installing and removing software from your computer can lead to security issues as well as long-term system slowdown.

The answer is to install and test your software within a safe and secure environment that does not affect your operating system. This is referred to as a 'sandboxed' environment that does not write any information to your Registry. Sandboxie is a free tool that you can use to test software; once removed, no information is written to or stored on your PC.

Sandboxie will also enable you to install and test games without having to store game information on your PC. ↘

PhotoVoice: working with positive negatives

"PhotoVoice is working to bring new voices to photojournalism: hear the world through their eyes." Sebastião Salgado

PhotoVoice is a multi-award-winning charity that brings about positive social change for marginalised and minority communities by providing photographic training with which participants can advocate, express themselves and generate income.

The PhotoVoice Manual

This ground-breaking manual is the only guide of its kind in the world for the design and delivery of participatory photography projects with marginalised and vulnerable groups. Produced in response to huge demand, this spiral bound manual includes a DVD showcasing slideshows and digital stories from PhotoVoice projects.

To order the manual, or to find out more about PhotoVoice visit www.photovoice.org

Registered Charity No. 1096598

PhotoVoice
www.photovoice.org

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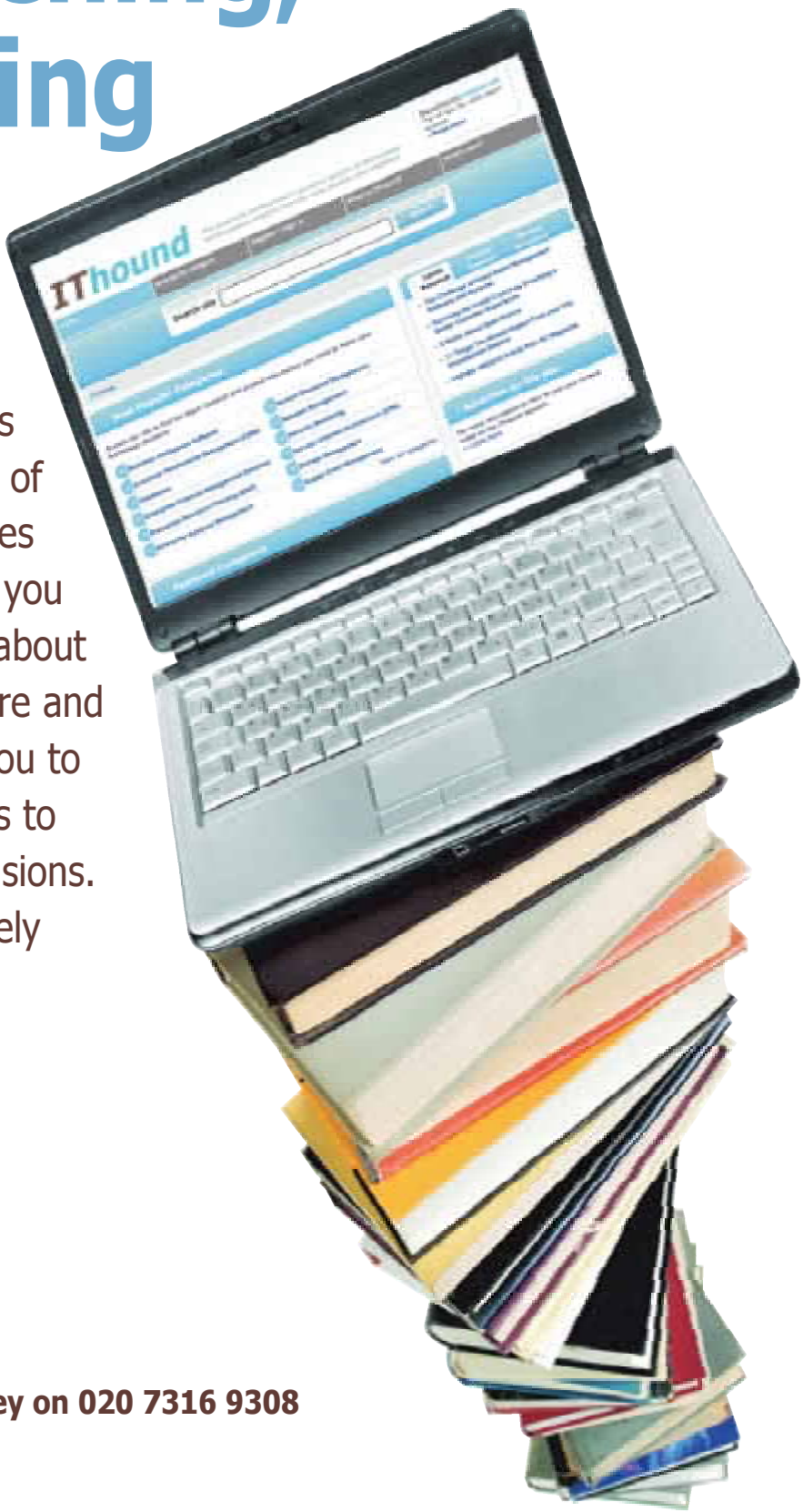

With more than 1,500 white papers, analyst reports, case studies and webinars IThound is one of the largest free libraries of information technology resources on the internet. IThound gives you access to detailed information about thousands of software, hardware and IT service solutions, allowing you to research and compare solutions to make informed purchasing decisions. Best of all, IThound is completely free to use.

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For all enquiries contact Paul Harvey on 020 7316 9308
or email info@ithound.com
www.ithound.com

AUDIO, VIDEO & PHOTO		
Ashampoo Photo Commander 6†**	www.ashampoo.com	Manage, edit and create slideshows from your favourite photos
Audacity 1.3.5†*	http://audacity.sourceforge.net	Record audio tracks, then export them as playable music files
GIMP 2.6.2†*	www.gimp.org	Enhance and edit your photos using this free paint tool
K-Lite Mega Codec Pack 4.3.1†*	www.codecguide.com	Collection of codecs for encoding and decoding audio and video
MediaCoder 0.6.2.4200†*	http://mediacoder.sourceforge.net	Universal audio/video batch transcoder
Paint.NET 3.36†*	www.getpaint.net	A free replacement for Microsoft's Paint software
Picasa 3†*	www.picasa.com	Transfer pictures from your digital camera and perform basic editing
Screenshot Captor 2.44.01†*	www.donationcoder.com	Screen capture tool
Sib Icon Editor 4†*	www.sibcode.com	Design high-quality icons
Songbird 0.7.0†*	www.songbirdnest.com	Media browser and music player built from Firefox's browser engine
VideoSpin 1.1†*	http://videospin.com	Create your own videos in minutes and export them to your home page
Wavosaur 1.03†*	www.wavosaur.com	Audio clip editor that also records and designs sounds
BACKUP, RESTORATION & FILE MANAGEMENT		
Avira AntiVir Rescue System†*	www.free-av.com	Build a bootable system rescue disc to safeguard against major issues
Backup4All 4 Lite**	www.backup4all.com	Quickly back up and restore your most important files online or to disc
Bart's PE Builder 3.1.10*	www.nu2.nu	Create a bootable Windows CD-Rom/DVD from the original Windows CD
Cobian Backup 9.5*	www.educ.umu.se/~cobian/cobianbackup.htm	Copies files/folders in original or compressed mode to other locations
DriveImage XML 2.02*	www.runtime.org	Easy-to-use program for imaging and backing up
DriverMax 4.7*	www.innovative-sol.com	Easily reinstalls all your drives if you need to get Windows back
Dropbox 0.6.402*	www.getdropbox.com	Share and synchronise your files with other users, via a remote site
EASEUS Disk Copy 2.3†*	www.easeus.com	Copy a drive or partition to another drive (or partition)
ERUNT 1.1j*	www.larshederer.homepage.t-online.de	Recovery utility for restoring and backing up your Windows Registry
Evernote 3.0.0.788†*	www.evernote.com	Online portal for sharing and storing notes and other important info
HDClone Free 3.6.2*	www.miray.de	Easily make an exact copy (or clone) of a hard disk or disk partition
Paragon Partition Manager 9 Express†**	www.paragon-software.com	Schedule a backup at the end of every working day or week
Recuva 1.20*	www.recuva.com	Recover accidentally deleted files, particularly those in the Recycle Bin
Spybot Boot CD 1.03*	www.safer-networking.org	Create a bootable, secure recovery CD with minimal user interaction
SyncBack SE 5.1***	www.2brightsparks.com	Synchronise files across computers, online or portable USB stick
Syncplicity 2.0.3228*	www.syncplicity.com	Keep your files up to date by synchronising them across your computers
SyncToy v2.0*	www.microsoft.com	Keep track of renamed folders and files in a synchronised folder
Ultimate Boot CD 4.1.1†*	www.ultimatebootcd.com	Bootable CD with diagnostic, repair and enhancement tools
BROWSERS, MANAGERS & EXTENSIONS		
Adblock Plus 0.7.5.5*	http://adblock.mozdev.org	Firefox add-on that helps prevent adverts and annoying pop-ups
All in one Sidebar 0.7.6*	http://firefox.exxile.net	Assistant that can even view a website's security certificate
CookieSwap 0.5*	www.cookieswap.mozdev.org	Firefox cookie swap manager to set up multiple users from one browser
Fancy Numbered Tabs 1.2*	www.hasonetoomany.com	Quickly add a number to your Firefox tabs for better browsing
Fast Dial 2.11*	http://userlogos.org/extensions/fastdial	Add an Opera-style speed dial option to your welcome page
Firefox Backup Extension 6.0.3*	http://customsoftwareconsult.com	Back up and restore Firefox settings if you need to reinstall Windows
Firefox Showcase 0.9.4.8*	www.showcase.uworks.net	Shows Firefox tabs and windows as thumbnails in a single window
Flagfox 3.3.4*	http://addons.mozilla.org	Displays a country flag depicting location of current website's server
Flashgot 1.1.4*	www.flashgot.net	Firefox extension that handles multiple external download managers
Foxmarks Bookmark Synchronizer 2.6*	www.foxmarks.com	Access bookmarks from any machine
Gmail Notifier 0.6.3.9*	www.google.com	Simple application that alerts you to new Google Mail messages
Google Chrome 0.4*	www.google.com	Interesting web browser with some exciting technological changes
GooglePreview 3.16*	http://ackroyd.de/googlepreview	Firefox add-on to preview Google search results as website images
IE Tab 1.5.2*	www.ietab.mozdev.org	View Internet Explorer content within Firefox, in its own tab
JiWire Hotspot Helper 2.2****	www.jiwire.com	Look for and highlight wireless hotspots in your area
Mini Map Sidebar 0.3.8*	http://minimap.spatialviews.com	A suite of in-built maps and mapping tools for your web browser
Morning Coffee 1.32*	http://addons.mozilla.org/en-US/firefox/addon/2677	Firefox add-on that can assign web pages to particular days
Mozilla Firefox 3.0.4*	www.mozilla.com	Flexible, powerful and stable web browser
Mozilla Geode 1.5*	http://labs.mozilla.com	Use your laptop to find your location and local services using Firefox
Mozilla Weave 0.2.7*	http://labs.mozilla.com	Firefox add-on for backing up and synchronising bookmarks
Opera 9.62*	www.opera.com	Reliable and secure browser that is very fast to display pages
Orbit Downloader 2.7.8*	www.orbitdownloader.com	Easy-to-use download manager
ScribeFire 3.1.3*	www.scribefire.com	Quickly make blog posts from Firefox
Web Developer Toolbar 1.14*	www.chrispederick.com	Toggle elements of a web page to see the effect on the browser

Key: † = program not on CD, * = freeware, ** = full software, *** = shareware, **** free for personal use

BURNING & MEDIA		
Ashampoo Burning Studio 8†*	www.ashampoo.com	Burning package for quickly writing and producing discs
BurnAware Free 2.1.7†*	www.glorylogic.com	Designed to burn your data and audio discs as quickly as possible
CDBurnerXP 4.2.2.1012†*	www.cdburnerxp.se	Powerful tool for burning any kind of disc, from CD to Blu-ray
FinalBurner Free 2.6†*	www.protectedsoft.com	Creates almost any disc format
Floola 4†*	www.floola.com	Efficiently manage your iPod or your Motorola mobile phone
GB-PVR 1.2.13†*	www.gbpvr.com	Schedule TV recordings, and view and pause live TV
ImgBurn 2.4.2†*	www.imgburn.com	To distribute an ISO image, simply select it and burn
MediaMan 3†***	www.imediaman.com	Organise your books, audio CDs, movies, video games and other media files
MediaMonkey 3.06†*	www.mediamonkey.com	Music manager and media jukebox for music collectors and iPod users
MediaPortal 1.0 RC3†*	www.team-mediaportal.com	Turn your PC/TV into an advanced Media Center
Video DVD Maker FREE 3.12†*	www.protectedsoft.com	Convert video into an appropriate format and burn it to disc
VLC Media Player 0.9.6†*	www.videolan.org	Comprehensive audio and video media player that plays back most formats
BUSINESS, OFFICE & COLLABORATION		
Chandler 1.0.2†*	www.chandlerproject.org	Personal information manager that works irrespective of platform
doPDF 6.1.276†*	www.dopdf.com	Make a PDF from just about any Windows application
EssentialPIM Free 2.81†*	www.essentialpim.com	Multilingual PIM with a calendar, note taker and contact manager
Lotus Symphony 1.2†*	http://symphony.lotus.com	Free office suite that supports ODF and Microsoft Office documents
Notepad++ 5.1†*	http://notepad-plus.sourceforge.net/uk/about.php	Improved Notepad, especially if you do any kind of programming
Notepad2 3.0.20†*	www.flos-freeware.ch	A fast and lightweight Notepad-like text editor with syntax highlighting
OpenOffice 3†*	www.openoffice.org	Office suite: word processor, spreadsheet, database and presentation graphics
PNotes 4.0.112†*	http://pnotes.sourceforge.net	Add sticky notes, in various designs and formats, to your desktop
Spicebird 0.7†*	www.spicebird.com	Collaboration tool that integrates Thunderbird and Sunbird standalone calendar
TeamDrive 1.4†*	www.teamdrive.net	Make sure only authorised users have access to files you want to share
Total Organizer 2.4.3†*	www.konradp.com	Manage small office projects and tasks you face around the home
VirtualBox 2.0.6†*	www.virtualbox.org	Use this tool to host a virtual operating system on your computer
CHAT & COMMUNICATION		
Camfrog 5.1*	www.camfrog.com	Join real streaming video chatrooms
Digsby build 37*	www.digsby.com	An instant messaging client with tools for social networking online
Gizmo Project 4.0.4*	www.gizmoproject.com	Use your internet connection to make calls to other computers
PeerAware 1.03*	www.peeraware.com	Share articles, addresses and links by pasting them into the chat area
Pidgin 2.5.2*	www.pidgin.im	Multi-platform instant messaging program
Skype 3.8.0.188*	www.skype.com	Cheap local and international calls over the internet
DEVELOPER & WEB DEVELOPMENT TOOLS		
Aptana Studio Community 1.1†*	www.aptana.com	Coding tool for HTML, CSS or Javascript programming
Free CSS Toolbox 1.1*	www.blumentals.net	CSS editor aimed at web developers who want to make changes quickly
Inno Setup 5.2.3*	www.jrsoftware.org	Professional-level application that wraps files within a Windows installer
Twistpad 1.64*	www.carthagosoft.net	Feature-packed coding tool that replaces Notepad
WinMerge 2.10.2*	http://winmerge.org/	Load two text files and compare the differences
wyUpdate Express 1.01*	www.wyday.com	Add an auto-update facility to your software
GENERAL UTILITIES		
Desktops 1.0*	www.microsoft.com	Open and manage up to four virtual desktops on one screen
Foxit Reader 3*	www.foxitsoftware.com	Quickly open, view and annotate PDFs with this lightweight viewer
JRE 6r4*	http://java.sun.com	Java installer with Java virtual machine, runtime libraries and app launcher
Microsoft .NET Framework 3.5*	www.microsoft.com	Installs the .NET Framework runtime
Peazip 2.4*	http://peazip.sourceforge.net	Archive management tool for opening and creating different archive types
ReNamer 5.40*	www.redbrick.dcu.ie/~den4b	File renaming tool that offers all the standard renaming procedures
INTERNET, NETWORKING & WIFI TOOLS		
Avanquest Connection Manager**	www.avanquest.com	Quickly reconfigure your system profile to match a current network
Bandwidth Monitor Lite 2.0.135*	www.rokario.com	Track bandwidth used over the current hour, day, week, month, or even year
CrossLoop 2.3*	www.crossloop.com	Secure screen sharer designed for people of all technical skill levels
Devicescape 2.0.110*	www.devicescape.com	Auto-connect to networks and hotspots within your preferences
FileZilla 3.1.5*	http://filezilla-project.org	Download files using FTP, and auto-resume and integrate with your browser
Free Download Manager 2.6.810*	www.freedownloadmanager.org	Download accelerator and manager that can download an entire website
LogMeIn Hamachi 1.03*	www.hamachi.cc	Zero-configuration VPN tool that will quickly connect multiple computers
SiteUp 1.1*	www.xequte.com	Monitor multiple websites and determine whether the server is still up
WeFi 3.3*	www.wefi.com	Roam wireless network users and connect to free Wifi networks
Whisher 3.0.03*	www.whisher.com	Share your Wifi network and find free networks
WinSCP 4.1.7*	http://winscp.net	FTP client for logging in to remote servers, websites or other locations
zFTP Server 3.3****	http://zftpserver.serveftp.com	FTP server that can set up anonymous and secure access to your files

Key: † = program not on CD, * = freeware, ** = full software, *** = shareware, **** free for personal use

OPTIMISATION & DIAGNOSTICS		
Active Hard Disk Monitor 1.2*	www.disk-monitor.com	Checks and monitors the status of your hard drives to help prevent data loss
Auslogics Disk Defrag 1.5.19.330*	www.auslogics.com	Speed up your old computer by defragmenting your hard drive or partition
Autoruns 9.35*	www.sysinternals.com	Goes much further than MSConfig in that you can temporarily disable startup items
CCleaner 2.13.720*	www.ccleaner.com	Popular system cleansing and optimisation tool
Defraggler 1.04.098*	www.defraggler.com	Small and compact defragger for collections of files as well as entire drives
Eusing Free Registry Cleaner 2.0*	www.eusing.com	Scans your Windows Registry for invalid or obsolete information and lists errors
Iolo Search and Recover 5**	www.iolo.com	Locates and restores accidentally deleted or lost files
Paragon Partition Manager 9 SE**	www.paragon-software.com	Excellent partitioning software for amending, resizing, deleting and merging partitions
PC Tools Registry Mechanic 7**	www.pctools.com	Comprehensive Registry optimisation and tool for speeding up your computer
IObit SmartDefrag 1.03*	www.iobit.com	Defrag tool for when you find your system starting to run a little slow
Process Monitor 2.02*	www.microsoft.com	Monitoring tool that shows real-time file system, Registry and process/thread activity
Revo Uninstaller 1.75*	www.revouninstaller.com	Remove any unwanted application without leaving any traces on your drive
SUMo 2.3.8.64*	www.kcsoftwares.com	Update tool that will check installed software and look for updates
Total Uninstall 5.01***	www.martau.com	Makes a good attempt at completely erasing an installed application
TweakVI Basic 1.0.1090*	www.totalidea.com	Tweaks and optimisations including automatic improvement to internet connections
UpdateStar 2.5*	www.updatestar.com	Searches through your installed apps and finds, downloads and installs updates
vLite 1.2*	www.vlite.net	Allows easy removal of unwanted components in Vista. Build a lite Vista install DVD
WinOptimizer 2009**	www.ashampoo.com	Complete suite of tools for optimising, boosting, recovering and enhancing Windows
PORTABLE APPLICATIONS		
7-Zip Portable 4.57†*	www.7-zip.org	Portable file archiver for compressed 7z, ZIP, GZIP, BZIP2, TAR, RAR files and more
Audacity Portable 1.2.6†*	http://audacity.sourceforge.net	Portable version of audio editor that lets you edit audio files on the move
ClamWin Portable 0.94.1†*	http://portableapps.com	One of the few open source and regularly updated and supported anti-virus tools
Eraser Portable 5.82†*	http://portableapps.com	Make sure the files you want to delete are permanently erased from your computer
EssentialPIM Free Portable 2.81†*	www.essentialpim.com	Superb tool for taking your contact information, to-do list and diary on the road
FileZilla Portable 3.1.5.1†*	http://portableapps.com	Administer your home page, website or remote server on the road
GIMP Portable 2.6.3†*	http://portableapps.com	Quickly edit and enhance your photos with the portable version of the image editor
KeePass 1.14†*	http://keepass.sourceforge.net	Portable version of the password manager for secure password management
Miranda Portable 0.7.12†*	http://portableapps.com	For when you have friends on all the instant messaging services
OpenOffice Portable 2.4.1†*	http://portableapps.com	Fully fledged office suite, with word processor, spreadsheet and presentation graphics
Opera Portable 9.62†*	http://opera-usb.com	Portable version of Opera that leaves no traces of internet session on the computer
PeaZip Portable 2.2†*	http://peazip.sourceforge.net	Open and create archive types, including primary formats such as ZIP, RAR and TAR
Pidgin Portable 2.5.2†*	http://portableapps.com	Multi-network messenger application that enables you to chat with other friends
PNotes Portable 4.0.112†*	http://pnotes.sourceforge.net	Throw your physical stickies away and replace them with virtual equivalents
Portable Bookmarks 2.1†*	www.portable-bookmarks.com	Bookmark manager that can be put on a USB stick or any removable device
Portable Start Menu 2.1†*	www.aignes.com	Tool to launch applications from a portable USB stick or external drive
Revo Uninstaller Portable 1.75†*	www.revouninstaller.com	Quickly remove any trace of unwanted software installed on your computer
RoboForm2Go 6.9.9.1†*	www.roboform.com	Securely store all your passwords and login details on a USB key, for use on any PC
Task Coach Portable 0.71.2†*	http://portableapps.com	Single-person solution for managing a project, or a set of projects
VirtualDub Portable 1.8.6†*	http://portableapps.com	Turn your laptop into an editing suite with this portable video-processing tool
VLC Media Player Portable 0.9.6†*	www.videolan.org	Multimedia player that supports MPEG-1, MPEG-2, MPEG-4, DivX, MP3 and OGGSecurity
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Comodo Internet Security 3.5.55810.432*	www.personalfirewall.comodo.com	Suite of security tools designed to protect you against the majority of online threats
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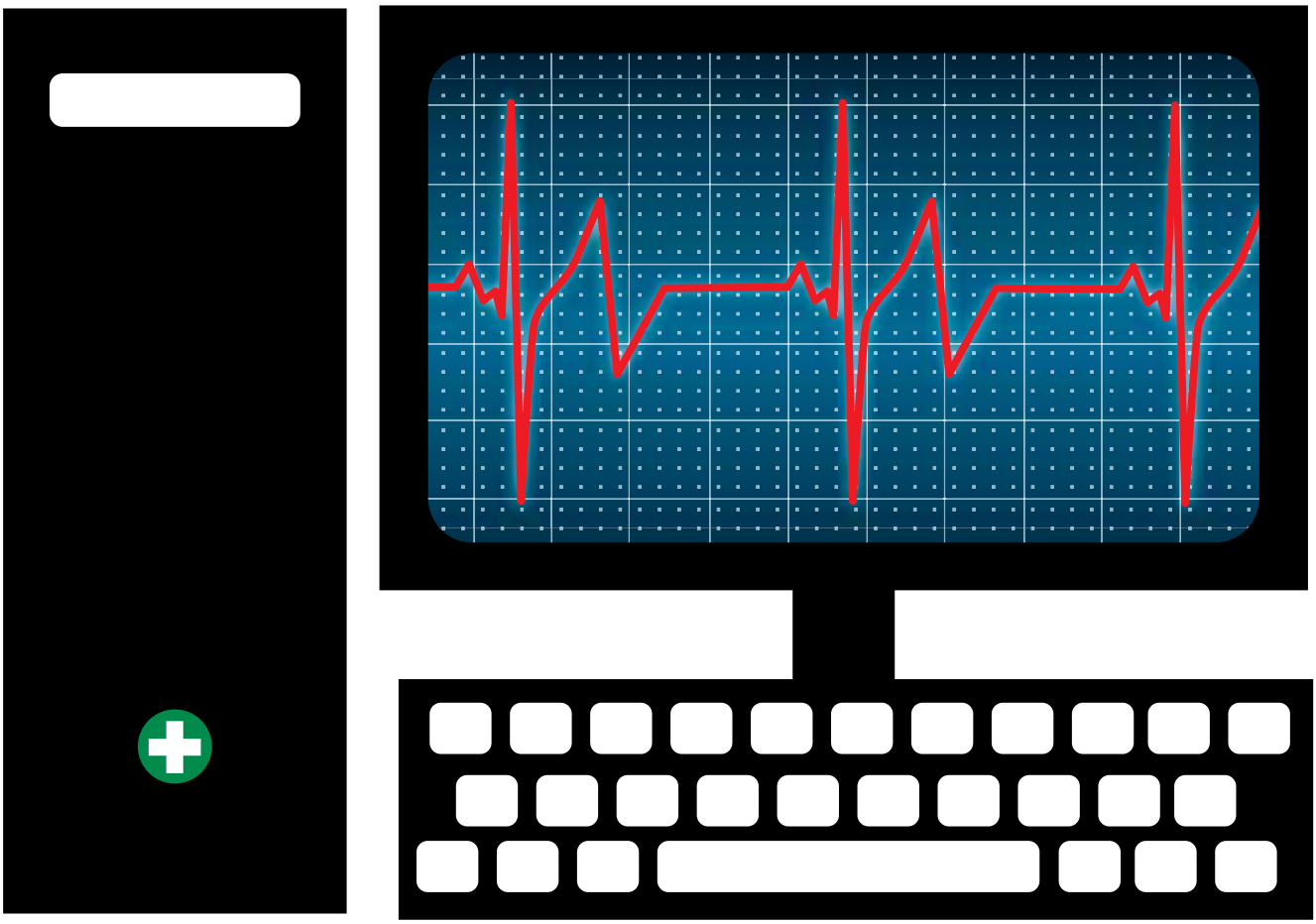
Dr PC will see you now

Computers are playing an increasingly important role in healthcare. Jon Thompson makes a digital appointment to find out more about the exciting new technology



In recent years, an unprecedented explosion in personal technology has transformed how we live and work. Now the same is happening to healthcare. In labs across the world, the blind are seeing again for the first time in years, the disabled are beginning to walk again, and everything from wheelchairs to robotic limbs are being controlled by thought alone.

The diagnosis and monitoring of disease is also set to undergo its own revolution with devices that, while they may not match *Star Trek's* tricorder just yet, will come very close to it by enabling GPs to diagnose a wide range of serious diseases in the surgery.

Information taken directly from biosensors worn by patients will also provide GPs and other healthcare professionals with an up-to-the-minute medical history, enabling better and faster diagnoses.

Healthy people are already reaping the benefits of technology designed to keep them in the gym, having fun while they exercise, and we can look forward to devices that will soon turn the humble mobile phone into something that protects us against everything from sunburn to carbon monoxide poisoning.

In this feature, we'll explore some of the technologies you'll see in the coming years, and some that have already made an impact.

15-minute diagnosis

When *Star Trek's* Dr 'Bones' McCoy waved his medical tricorder over a patient, it told him instantly what was wrong and, more importantly, what to do about it. Like so much *Star Trek* technology, the writers created the tricorder to move the story along in a believable, but convenient, way. Science, however, has an uncanny knack of catching up with fiction. For example, Elisha, a project by researchers at the University of Leeds, (**www.immunosensors.com**) promises to bring the idea of a tricorder closer to reality.

Still under development, Elisha will be able to detect a range of diseases and conditions – from prostate and ovarian cancer, to stroke and even multiple sclerosis – in around 15 minutes. "We believe this is the next-generation diagnostic testing," said Dr Paul Millner of the Faculty of Biological Sciences at Leeds University, who leads the Elisha team. "We can now detect almost anything faster, cheaper and more easily than the current accepted testing methodology."

When you suffer disease or injury, your body mounts an immune response. Tell-tale chemicals enter the bloodstream, and these can be analysed to discover what's wrong. Presently, however, a blood sample has to be sent away to a hospital pathology lab, where ↘

Microsoft's Healthvault service enables patients to update and share their medical histories

special antibody tests indicate the presence or absence of different diseases.

The approach taken by the Elisha team is to impregnate a nanoscale surface with a range of such antibodies, to which a sample of urine or blood is then introduced. When gently electrified, these highlight the presence or absence of different chemicals indicating disease. The technology is so sensitive it can detect a mere picogram of a chemical in a millilitre of fluid, meaning that non-medical versions will also be useful in a range of roles.

'Elisha will be able to detect a range of diseases – from cancer to stroke'

Millner believes it's only a matter of time before such instant diagnostic tools become commonplace: "Elisha will eventually be seen by hospital beds as a novel 'point of care' diagnostic technology, as well as providing on-site, instant testing for pollution of food and water, or for GM contamination."

Healthvault

Obtaining a diagnosis in a few minutes will undoubtedly help save lives, but having a detailed medical history in future will also help to keep you from inadvertent harm.

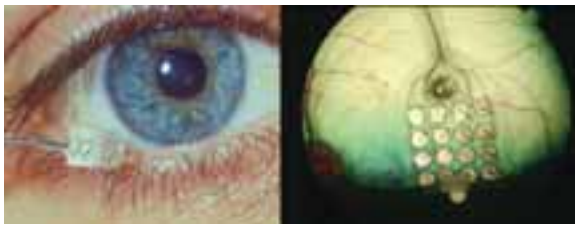
US DNA testing company Genelex (**www.healthanddna.com**) estimates that the fourth-largest cause of premature death is adverse reactions to medications, sometimes caused by a patient having an incomplete medical history.

To help ensure that healthcare providers have access to as much clinical information about a patient as possible, Microsoft is launching Healthvault (**www.healthvault.com**). Though still in beta testing and only available in the US, Healthvault may also raise the eyebrows of privacy campaigners if the website's blurb is anything to go by.

"You should be able to use your health information wherever and whenever you want," says the introduction to Healthvault. "You should be able to share it with whoever you want and decide what they can see and can't. Healthvault can help you do that."

As well as their official medical records, Healthvault users can also upload extra information, including any non-prescription drugs and supplements they're taking, immunisations they've had, allergies, phobias, test results, dietary restrictions and so on. Usefully for doctors, users can also upload data from a wide range of devices used to monitor things such as blood sugar levels, heart rate and blood pressure. The range of devices the website can read is large and growing. By giving healthcare professionals access to the collected data, the idea is that patients can receive the best treatment far faster than at present. They can even lodge their records with a third party in case of emergency.

Healthvault also allows users to share their medical histories with dozens of commercial organisations that have signed up as potential recipients of that data. For example, Applied Informatics uses Healthvault to match patients with their own database of over 25,000 drug trials. With breakthroughs in experimental treatments accelerating, for sufferers of some life-threatening conditions, being able to find and participate in the right clinical trials could bring invaluable hope.



Top: the Israeli Rewalk exoskeleton is coming to Europe in 2010, but with a price tag of $20,000. Will it be affordable to enough people?

Bottom: the artificial retina chip is primitive, but is already helping patients to see again

The bionic future

Spinal injuries destroy thousands of lives each year, but exciting new technologies are poised to restore the independence of an increasing number of people. One due for commercial release allows the paralysed to walk again using an external skeleton, or exoskeleton. The word conjures images of Sigourney Weaver fighting an alien inside a bulky

cargo stacker, but Israeli company Argo (**www.argomedtec.com**) is using the principle in a remarkable way.

Simon Miller is one spinal injury victim that Argo's Rewalk system may soon help. Paralysed when a car pulled out in front of his motorbike in August 2000, he'd given up hope of a technology that can repair damaged nerves and had all but stopped following the progress of other innovations.

Miller was pleasantly surprised to hear about Rewalk. "It sounds like a great idea," he told us. "It would make life easier – it would be nice to get into the countryside. I was expecting something really bulky, but this is really subtle. It looks like the user is recovering from an injury rather than being paralysed – that can do a lot for people's self-esteem."

"In principle," said Argo spokesman Uri Attir, "any spinal cord injury victim with lower limb paralysis, who has normal control over his shoulders and hands, might be a candidate for Rewalk. However, there may be exceptions." Despite his caution, Rewalk goes on sale in Europe in early 2010. The bad news for some potential users is the price. "It will likely not be cheaper than $20,000 to the end user," Attir said.

At current exchange rates, this should work out to around £13,000. State-of-the-art wheelchairs can cost anything up to £7,000, so the Rewalk may be out of reach for a great many people.

Restoring movement in paralysed limbs

The goal of being able to restore paralysed limbs recently came one very important step closer to reality. In October 2008, scientists led by Professor Eberhard Fetz of the University of Washington in Seattle showed for the first time that it's possible to re-route neural signals past damaged nerves and straight into muscles.

Even after several years, patients who have lost the use of limbs still have the use of the neurons in the motor cortex of their brains. Trying to move a paralysed leg, for example, still causes associated neurons to fire as if nothing were wrong.

Using this fact, Fetz's team has managed to restore a small amount of movement to a group of Macaque monkeys with paralysed arms. The primates quickly learned to move their wrists again, well enough to play a simple game. What's more, the team also found that it's not necessary to tap into the exact neurons associated with moving a paralysed limb for the technique to work.

"These results are the first demonstration that direct artificial connections between cortical cells and muscles can compensate for interrupted physiological pathways and restore control of movement to paralysed limbs," the team reported in their research paper, published in scientific journal *Nature*.

The team's work now focuses on miniaturising the brain implants required to pick up signals in the motor cortex, and on using wireless connections to amplify and transmit them to the affected muscles.

Second sight

Restoring sight is also set to become a reality thanks to Illinois-based Second Sight Medical Products (**www.artificialretina.energy.gov**). The company, spawned from the Artificial Retina Project and funded by the US Department of Energy, is implanting simple chips that compensate for retinas damaged by disease.

Terry Byland was devastated to learn he was losing his sight to an inherited condition called retinitis pigmentosa. "My family saw me at my worst and didn't know from one day to the next what emotional state they'd find me in," he said.

It took just seven years from noticing he had problems seeing in low light to losing his sight completely, but after a further 11 years of complete blindness, Byland became the sixth recipient of the still experimental chip. It's far from a perfect solution, however. Byland can only distinguish between light and dark with the chip's matrix of 16 stimulating terminals, but it has made the world of difference to him.

'It was the first time I had seen anything of my son since he was five years old'

In particular, recognising his 18-year-old son's shadow was a landmark.

"It was the first time I'd seen anything of him since he was five years old," said Byland. "It sounds pretty primitive to a sighted person, but for a blind person like me, it's really amazing to see anything at all."

While able-bodied gamers use this revolutionary Epoc headset to play games, others use similar technology to speak

Ambient Corporation's Audeo system, demonstrated by co-founders Michael Callahan and Thomas Coleman (seated)

Apple's Sync software aims to keep you in the gym longer by continually charting your progress

At present, the chip works with a miniature camera mounted in eyeglasses. This captures images and sends them via a wireless link to a unit worn on a belt. This processes them and transmits the result to a receiver on the artificial retina itself. This emits patterns of pulses, which travel along the optic nerve, allowing the patient to sense shifting patterns of light and dark.

Mind control

Controlling objects with the mind alone sounds like the ultimate lazy person's dream and, to a certain extent, it's already possible for well-heeled video gamers in the form of the Emotiv Epoc headset. However, similar technology is about to change the lives of people struggling with limited mobility.

In 2007, University of Chicago students Michael Callahan and Thomas Coleman founded Ambient Corporation. Under this banner, the pair have developed a sensor technology called Audeo (**www.theaudeo.com**), which allows someone with severe disabilities to control a wheelchair using the mere thought of speaking commands.

To do so, Audeo uses a neckband that reads the nerve impulses sent from the brain to the voice box, but what's particularly interesting is that the same technology can also control a speech synthesiser. Rather than speaking just single, stilted words at a time, users can produce a flowing stream of synthesised speech.

The idea has already seen Ambient win the Lemelson Prize. Co-founder Michael Callahan received the *EE News* Student of the Year Prize in 2007, and Ambient itself was named Champaign County Economic Development Corporation Startup Company of the Year. The company says if anyone knows someone who might benefit from its technology, they should visit **www.theaudeo.com/try.php** and fill in the contact form.

'Controlling objects with the mind alone sounds like the lazy person's dream'

Fit for the future

It's not just biomedical companies that are shaping the future of health. If the post-Christmas paunch is becoming more difficult to shift each year, there will soon be ways of keeping you on the dreaded treadmill, and even of protecting you from otherwise undetectable threats to health.

Take Apple, for instance. The company has already collaborated with Nike to produce the Nike+iPod Sports Kit (**http://tinyurl.com/6cxzqd**). For less than £20, you get a small module that fits into a special pocket in a Nike running shoe. As you exercise, it sends data over a wireless link to a receiver plugged into your iPod Nano to give real-time feedback on your performance.

Worthwhile workout

If you find it difficult to keep motivated beyond a few initial health club visits, however, you can use the same technology to 'rock the gym', as Apple puts it. The idea is that you plug your iPod into the computerised exercise machines at your health club, select your carefully prepared high-energy playlist to keep you going, and the iPod reads the data logged by the machine at the end of your workout. Your iPod even gets a free recharge as you work out. Back home, you can download the data into Apple's Sync software to keep a record of your progress.

Coming back to the idea of the medical tricorder, Nokia has begun showcasing its Eco Sensor Concept technology (**www.nokia.com/A4707477#stayintouch**). Users will wear special sensors, and their mobile phones will wirelessly receive the data they generate. Nokia's website describes a range of novel sensors, including a carbon monoxide monitor, an ultraviolet sensor to tell you when to apply a higher factor sunscreen, and even a noise level indicator to tell you if you're endangering your hearing.

Technologies such as the Eco Sensor Concept are still some way off, but like other ideas currently making their way out of the lab, it hints at a future where technology plays as big a part in our well-being as it already does in every other aspect of our lives. **PCW**

Virtual patients help out in drug trials

How close are we to developing a computerised model of a full human that can repeatedly contract disease and respond to treatment? With massive computing power now cheaply available, current models are already helping drugs companies understand their products in new ways.

Denis Nobel of Oxford University began building one of the earliest such biological simulations in the 1960s. After four decades of development, his model of the human heart is so accurate, CV Theraputics of Palo Alto, California (**www.cvt.com**) recently used it to help test its drug Ranolazine, which is being developed to treat angina.

And US bio-pharmaceutical company Entelos (**www.entelos.com**) has developed a virtual model of a diabetic mouse to study cures for Type 1 diabetes. Using Entelos' underlying Physiolab technology, researchers can test medications and dosages 'in silico' without ever harming a real rodent.

Entelos also uses Physiolab to create simulations of living systems it calls 'Virtual patients'. The company uses these to predict the outcome of drugs trials, and even to discover why a drug that works in animal trials might fail in humans.

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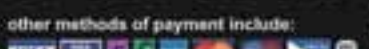

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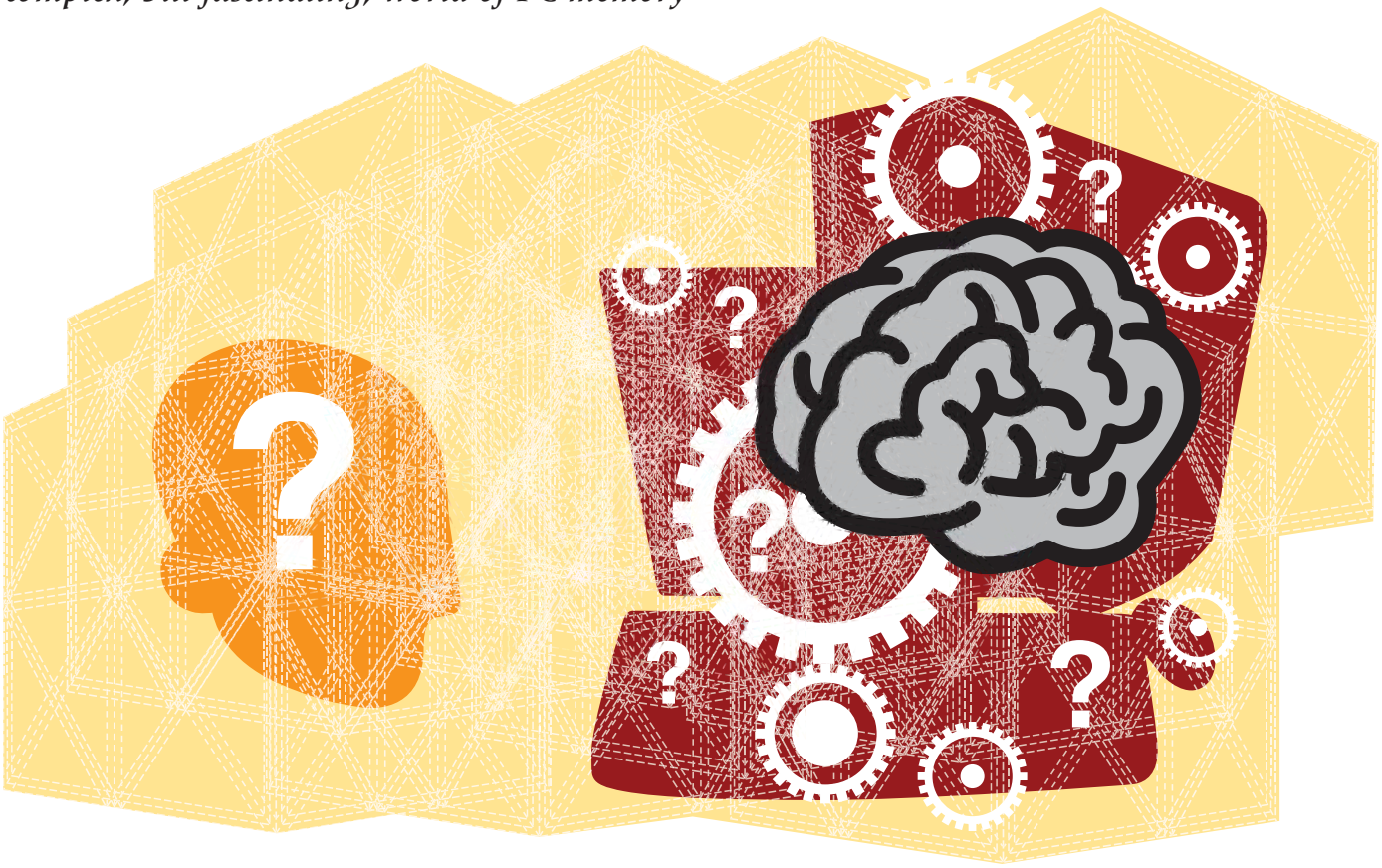
Memory matters

Kelvyn Taylor takes you on a guided tour through the complex, but fascinating, world of PC memory



If you're confused about memory, look no further. In this article, you won't find any breathless discussion of the latest memory heatsinks or flashing lights, but you will learn the basics of how a PC's memory works, why it's important and how to choose the right memory upgrade for your system.

We'll concentrate on the 'need-to-know' information that will help explain why choosing the right memory for your own PC is so important and, more importantly, why it's usually a waste of time poring over memory specification sheets to find something faster.

We can't cover everything about memory here, but if there's any aspect that still puzzles you, drop us a line (**letters@pcw.co.uk**) and we'll do our best to address the issues in future features or in our Hands On Question Time pages.

The internet is awash with hardware review sites that cover memory modules in excruciating detail. Unfortunately, a lot of the information is misleading, out of date or simply irrelevant. So unless you're designing a system to put on show, should you really care about the colour of the heatsink?

If you do think that the hue of the heatsink is important, then you're in the wrong place. In an attempt to add some glamour to what is a rather dull but technically complex commodity, memory manufacturers have become expert at adding all manner of 'features' that won't necessarily enhance your PC's performance but will allow a premium price to be charged for so-called performance memory. It may well be good memory, but you'll be disappointed if you're expecting it to work instant wonders.

Back to basics

We'll start with a simple fact that you rarely see mentioned: whatever the nominal data transfer speed quoted for a memory module, all currently available desktop memory chips operate at an internal frequency of no more than 200MHz, a figure that hasn't changed for many years (see chart on page 46). Even the latest 1,600MHz modules plod away internally at a speed eight times slower than the advertised rate. How so? Well, it's all down to some clever internal trickery. For a primer on how memory works, see the box on page 46.

All PCs and laptops now use DDR SD-Ram (double data rate synchronous dynamic Ram), although older models may still use the single data rate type, usually just called SD-Ram. You might even find a very old PC with asynchronous D-Ram, such as Fast Page Mode (FPM) or Extended Data Out (EDO) D-Ram, although it's getting harder to buy this type of memory, which comes in Simms (single in-line memory modules) rather than the modern Dimms (dual in-line memory modules).

Synchronous D-Ram is designed to operate at the same speed as the PC's system bus (the connection between the processor and memory); it's known as the FSB (front-side bus) speed. So if your

system bus runs at 133MHz, the memory clock will also run at 133MHz.

Double data rate simply means that for every bus clock 'tick', two packets of data can be transferred, giving a theoretical memory bandwidth of twice the nominal clock speed. So 100MHz DDR SD-Ram in a PC with a 64-bit system bus can transfer data at 200MHz; that's 64 bits of data 200 million times per second, or 1.6Gbits/sec.

In the interests of compatibility, memory manufacturers have agreed various design standards and also adopted a naming convention. For example, the 200MHz DDR memory just described is known as PC1600; the '1600' refers to the 1,600Mbits/sec transfer rate possible on a PC's 64-bit memory bus. See the table on page 47 for an explanation of memory labelling.

To confuse matters, there are several variations, such as PC4000 (250/500MHz), which don't correspond to normal system bus speeds and are generally produced for enthusiasts who want to overclock their memory. Some motherboards allow you to run the memory bus at a different speed to the system bus, but the benefits are dubious: synchronous memory is designed to work at the system bus speed.

DDR2

The original DDR memory was superseded by DDR2, also labelled as PC2-xxxx; for example, 400MHz DDR2 is known as PC2-6400. The number represents the theoretical data transfer rate: in this case, 6.4Gbits/sec.

Because DDR2 runs at a lower voltage (1.8V) than DDR (2.5V), it generates less heat and consumes less power. Standard DDR2 clock speeds are 200, 266 and 333MHz, although variants for overclockers exist, including 500MHz/1GHz PC2-8000 memory modules.

DDR2 Dimms are not compatible with DDR motherboards, as they use a 240-pin memory module rather than the 184-pin module of DDR memory.

DDR3

The latest type of memory module, introduced with the Intel Core i7 processor, is DDR3. It is even more power-efficient than DDR2, running at 1.5V or even 1.35V for some specialised low-power modules. It adds some technical features to boost data rates and improve reliability, such as the ability to clear the memory on reboot so the PC can start with a clean slate, as it were. It also increases the depth of the pre-fetch pipeline (see box on page 46) to eight bits versus DDR2's four bits, enabling data transfer rates of up to 800MHz (12.8Gbits/sec).

DDR3 uses the same 240-pin modules as DDR2, but the notch is in a different place to

Early memory

Unless you're a mathematical prodigy, chances are that you'll use a piece of paper to work out complicated arithmetic long-hand. The paper is acting as a short-term data store, or memory. Similarly, PCs use memory as a temporary scratchpad for the data they're processing.

Some of the early attempts to create computer memory were as mind-boggling as they were ingenious. Early computers used an assortment of methods for storing data, including rotating drums with capacitors and even mechanical memory. The photo here shows computing pioneer Maurice Wilkes with the memory used in the EDSAC computer at Cambridge University in 1949. EDSAC was one of the first practical general-purpose computers; for more information, see our interview with Wilkes at **www.pcw.co.uk/2045826**.

The memory in the picture is called acoustic delay line memory and relies on the speed of sound being much slower than the speed of light. Electronic data pulses travel around an electrical circuit at the speed of light; a long horizontal glass tube filled with mercury is inserted in the middle of the circuit. At one end of the tube is a loudspeaker; at the other a microphone. The data pulses are converted into sound and travel through the mercury to the other end, where they are reconverted into electrical pulses, cleaned up, re-amplified and sent round the circuit again. In this way, a train of 500-600 pulses (technically, 16 35-bit data words) could circulate around the system (in other words, be stored in memory) almost indefinitely. The computer can read the data only by monitoring the audio pulses when they're converted back into electricity, and data can be changed (written) by injecting new electrical pulses into the circuit. If the electricity is turned off, then all the data is lost.

Although it uses a totally different technology, the memory in a PC does the same job as those early mercury-filled tubes. The only major difference is that modern memory is random access, meaning that any part of the data can be accessed at any time, whereas the delay lines were serial access: you had to wait for the data pulses to arrive one by one at the end of the tube.

Mercury delay lines were bulky, complicated, temperamental and very temperature-sensitive. An alternative, used in the 1948 Baby computer at the University of Manchester, was based on CRT (cathode ray tube) technology and used a metal pickup to detect electrostatic charges at an array of locations on the screen of an oscilloscope. This information was then used to refresh the CRT display and so store the data in a similar way to a delay line. Because the CRT displayed the entire contents of memory at once, it allowed random access to any part of the memory.

As technology progressed, more effective types of memory, such as magnetic drums, magnetic tape and ferrite core memory, were invented, culminating in today's super-fast dynamic random access memory. This was invented by IBM and first appeared commercially with the launch of Intel's 1103 memory chip in 1970.

Maurice Wilkes inspects one of EDSAC's delay line memory tube arrays

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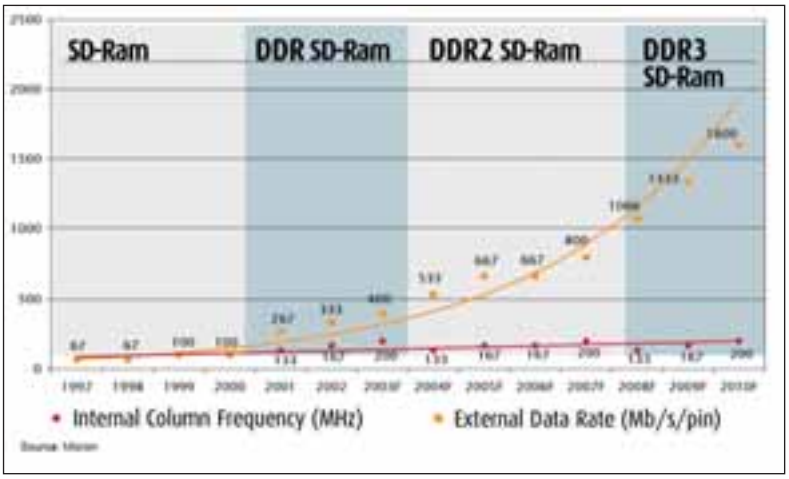


The internal speed of memory cells hasn't increased for many years

physically prevent the modules being used in the wrong motherboards.

But there are some more significant changes with the Core i7. The memory controller is now integrated in the processor, dispensing with the FSB (see our Core i7 PC group test on page 78 for more details). More importantly as far as your pocket is concerned, Core i7 supports triple-channel DDR3 memory with up to two Dimms per channel, the implications of which we look at below.

How to choose memory

The important thing to remember before selecting memory to upgrade your system is to read the motherboard/system manual or contact the vendor to find out what type of memory your system supports.

Most DDR-based systems have a dual-channel memory architecture, which means memory modules must be installed as matched pairs to get the full performance benefits of dual-channel operation, although you can just install a single module in each channel. 'Matched' means the modules must be identical in all respects, although they don't have to be the same brand. You can put different size modules in each of the two channels, but for peace of mind, it's best to stick with modules from the same manufacturer and with the same spec.

The good news is that installing a faster grade of memory than your PC supports is not a problem. It will operate at the motherboard's designated speed, and there

Refresh your memory

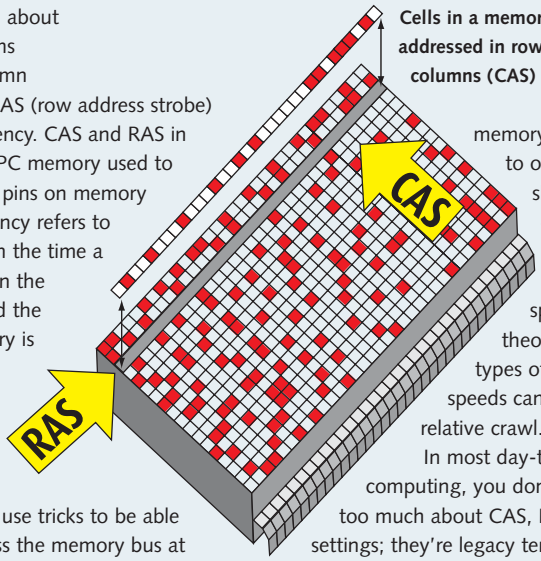
All modern PCs use dynamic random access memory (D-Ram) as their main working memory to let the processor (and other devices, such as I/O devices and graphics cards) store and read the data it needs to perform its computations. It is usually referred to simply as Ram.

D-Ram is volatile: when you turn your PC off, any data in it disappears. D-Ram is used because it's cheap, fast and reliable. Non-volatile memory (such as Flash) is expensive and can also 'wear out' over time.

The memory chips on a module consist of millions of individual cells that each store a single bit of data (a 0 or a 1); one megabyte (1MB) of memory contains 8,192,000 memory cells. The capacity of individual memory chips is usually quoted in megabits (Mbits); there are eight bits in a byte, so a 64Mbit chip provides 8MB of memory, and a 256MB module would need 32 64Mbit chips.

Each memory cell consists of a capacitor and an access transistor. The capacitor has two states – charged and discharged – which correspond to the binary 0 or 1 respectively. Data is written to a cell by charging (applying a high voltage) or discharging (applying a low voltage) the capacitor. Data is stored by turning off the access transistors, 'trapping' the high or low charge in the capacitor. Data is read by applying a voltage midway between the high and low voltage levels, turning on the transistor and seeing how the applied voltage changes. The capacitors need to be refreshed by applying a voltage every few milliseconds, which is why the technology is called 'dynamic' Ram.

Terms bandied about in hardware forums include CAS (column address strobe), RAS (row address strobe) and CAS/RAS latency. CAS and RAS in the early days of PC memory used to be physical signal pins on memory modules, and latency refers to the delay between the time a request is made on the CAS/RAS pins and the instant the memory is accessed. As memory cell speeds are still limited to around 200MHz, memory modules use tricks to be able to feed data across the memory bus at the massive speeds required by modern data-hungry PC subsystems.



Cells in a memory chip are addressed in rows (RAS) and columns (CAS)

Data is fetched from the memory cells in blocks and pumped down long pipelines on the module in a process known as pre-fetch. For the original DDR memory, the pre-fetch was two bits of data. DDR2 increased this to four, and DDR3 has an 8-bit pre-fetch.

Thus the system has access to large amounts of pre-fetched data that it can pass to the CPU at the full memory bus speed. But data pre-fetched at random might not be what the CPU wants, so the logic in the memory controllers tries to second-guess the system's needs based on previous requests.

For some types of operation this process works well, but if a program is requesting small amounts of newly written data, the memory has to fetch it to order, which slows everything down. This is why maximum quoted memory speeds are theoretical; for some types of data access, speeds can slow down to a relative crawl.

In most day-to-day computing, you don't need to worry too much about CAS, RAS or latency settings; they're legacy terms of interest only to the internal workings of a memory module. The system says 'get me this data' and the memory obliges in whatever way it can. Some PCs allow you to change the CAS and RAS parameters in the Bios, although it's unlikely you'll see much difference except variations in some synthetic benchmark scores. In real life, the mix of applications you're using will almost certainly hide these.

A Bios sets the memory timings automatically, based on information stored in a special non-volatile memory chip on the memory module called the SPD (serial presence detect). These settings default to parameters designed to ensure reliable operation in a wide variety of motherboards. If despite this you want to change them manually, it's entirely at your own risk.

won't be any hit on performance; nor, unfortunately, will there be any performance increase. But if you put underspecified memory in, it won't work at all. And trying to put DDR3 in a DDR2 board is a non-starter as it won't physically fit.

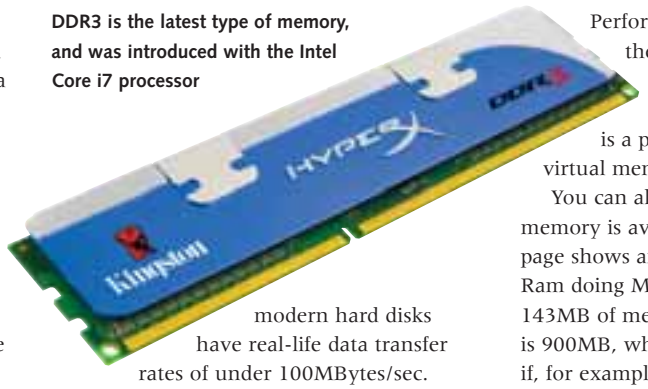
Core i7's triple-channel DDR3 support means that motherboards will support single-, dual- or triple-channel operation. Each channel can support one or two Dimms, so you could get motherboards with six Dimm slots. Intel's first Core i7 motherboard confusingly has four slots and three channels, and Intel doesn't explain why one channel is given two slots: the manual simply states that this extra slot shouldn't be populated.

The best way to be certain about getting the right memory is to go for a well-known brand and use the interactive memory, choosing tools offered by most of the top vendors, such as Buffalo, Crucial, Corsair, Kingston Technology, OCZ and PNY. Crucial, for example, offers a compatibility guarantee if you buy online via its configurator.

If you know exactly what you need, you can buy cheaper generic memory and take a chance, although these days price competition is robust and branded products don't command large premiums.

Memory decoder: The basic specs of common memory types

MEMORY TYPE	DESIGNATION	CLOCK SPEED (MHZ)	DATA TRANSFER SPEED (MHZ)	THEORETICAL MAX TRANSFER RATE (GB/SEC)
SD-Ram	PC100	100	100	0.8
SD-Ram	PC133	133	133	1.06
DDR	PC1600	100	200	1.6
DDR	PC2100	133	266	2.1
DDR	PC2700	167	333	2.7
DDR	PC3200	200	400	3.2
DDR	PC3700	233	466	3.7
DDR	PC4000	266	533	4
DDR2	PC2-3200	200	400	3.2
DDR2	PC2-4200	266	533	4.2
DDR2	PC2-5300	333	667	5.3
DDR2	PC2-6400	400	800	6.4
DDR2	PC2-8000	500	1,000	8
DDR3	PC3-6400	400	800	6.4
DDR3	PC3-8500	533	1,066	8.5
DDR3	PC3-10600	667	1,333	10.6
DDR3	PC3-12800	800	1,600	12.8



DDR3 is the latest type of memory, and was introduced with the Intel Core i7 processor

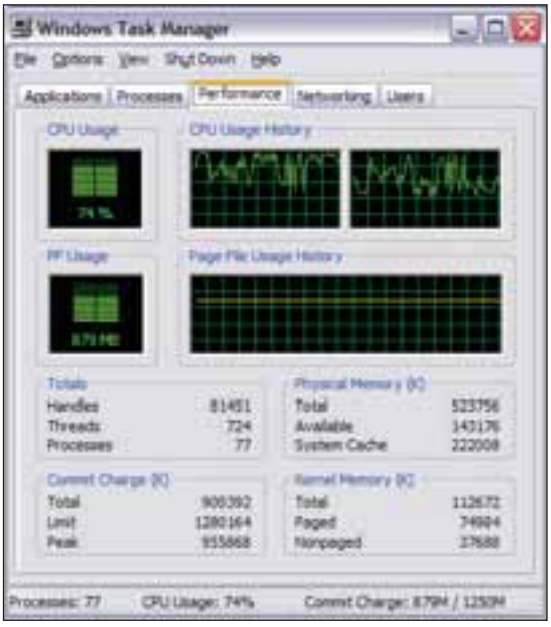
Why you can't get enough

Enough of the technical details. The real question is, how much does memory affect your real-life computing experience? Although modern motherboards often come with all manner of bells and whistles that will let you play with memory settings, the simple fact is that the most foolproof way to increase your PC's performance is to equip it with more physical memory.

The reason for this is that your processor can access data held in Ram much faster than it can get it from the hard disk, which is the only other location where your PC can store data. A 32-bit operating system such as Windows XP or Vista can address up to 4GB of memory (64-bit editions of XP and Vista support between 8GB and 128GB, depending on the version), and has to allocate this memory between programs and data. Programs and services are loaded into physical memory on a first-come, first-served basis, and what's left over is available for programs to use for working data.

Few systems can boast 4GB of memory, but Windows is able to use the hard disk as virtual memory. However, the fastest modern hard disks have real-life data transfer rates of under 100MBytes/sec. Some 10 times slower than the slowest DDR memory, so whenever data is placed in virtual memory on a hard disk, the system's performance suffers as the CPU can't get the data quick enough.

If you open up Windows Task Manager during normal operation and click on the Performance tab, the bottom graph on the screen reveals your system's virtual memory usage, shown as 'pagefile usage' (the pagefile is a protected system file used for virtual memory).



Adding extra memory can ease the strain on your PC's resources when performing demanding tasks

You can also see how much physical memory is available. The screenshot on this page shows an XP system with 512MB of Ram doing MPEG2 encoding: there's only 143MB of memory available and the pagefile is 900MB, which will have a dramatic effect if, for example, you try to edit a large digital photo at the same time.

For comparison, on an XP machine with 1GB of Ram running 11 assorted applications, we recorded the available memory as 212MB and 700MB pagefile usage. Both machines had a 3GHz Pentium 4 CPU, but the one with the most Ram felt much more responsive when multitasking. The performance hit of virtual memory is biggest for memory-intensive programs such as photo or video editing.

This effect is hard to show in benchmark tests as multitasking performance isn't easily measured. We saw only a five per cent performance gain by upping Ram from 256MB to 1GB while encoding a 1GB Vob file to DivX, but the extra memory allowed other applications to run more smoothly.

There are a few programs that promise to optimise your memory usage. While they can help to improve Windows' built-in memory management, in the long run you're better off investing in physical memory.

Finally, we're going to break the promise we made at the beginning. Should you really care about flashing LEDs and pretty coloured heat spreaders on your memory? Not really, but even we have to admit that they do look good. **PCW**

Types of memory module

It's not only memory technology that has evolved – its packaging has too. The memory chips in the original IBM PC in 1981 were mounted directly on the motherboard, with extra memory added via an expansion card.

The first memory modules intended to make their replacement by users simpler appeared in 80286-based PCs. These models had 30 pins that fitted into holes in the motherboard and were known as Sipp (single in-line pin package) modules.

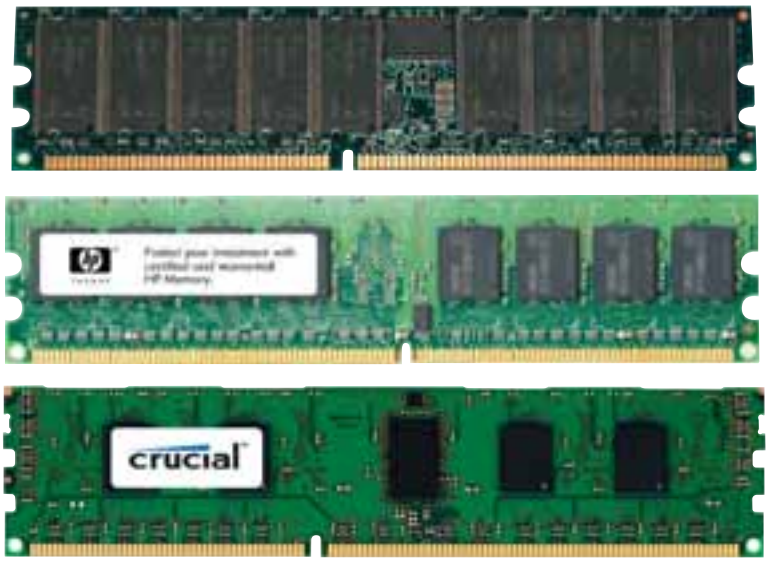
Later came single in-line memory modules, or Simms, which were available in 32- and 72-pin variants, and introduced the familiar easy-to-use motherboard mounting slot.

Today's modules are Dimms, which started out as 168-pin modules for SD-Ram, migrating to 184 pins for the original DDR Ram. DDR2 and DDR3 Ram Dimm modules come with 240 pins, although the notches are in different locations to prevent the wrong memory being used in a system.

One other type of memory you may come across is the Rambus Rimm (Rambus in-line memory module), which is recognisable by a distinctive heatsink covering the chips.

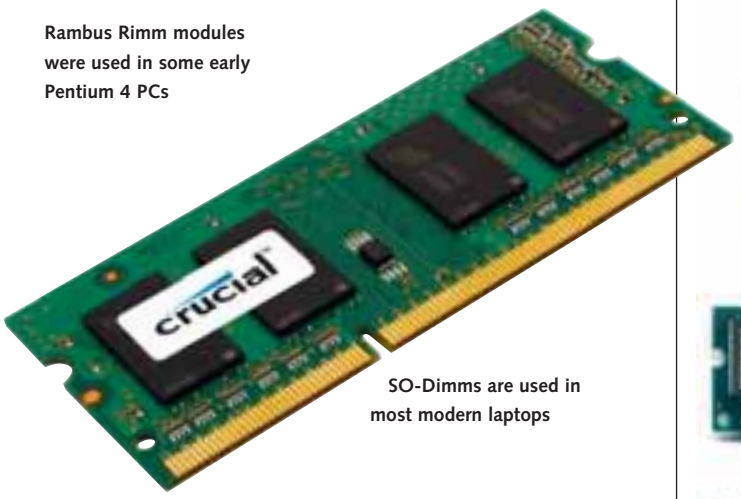
This was used for a short time in some of the first Pentium 4 PCs. Rambus memory requires any unused slots on the motherboard to be populated with terminator modules.

For laptops, the small outline Dimm (SO-Dimm) is the standard memory module.

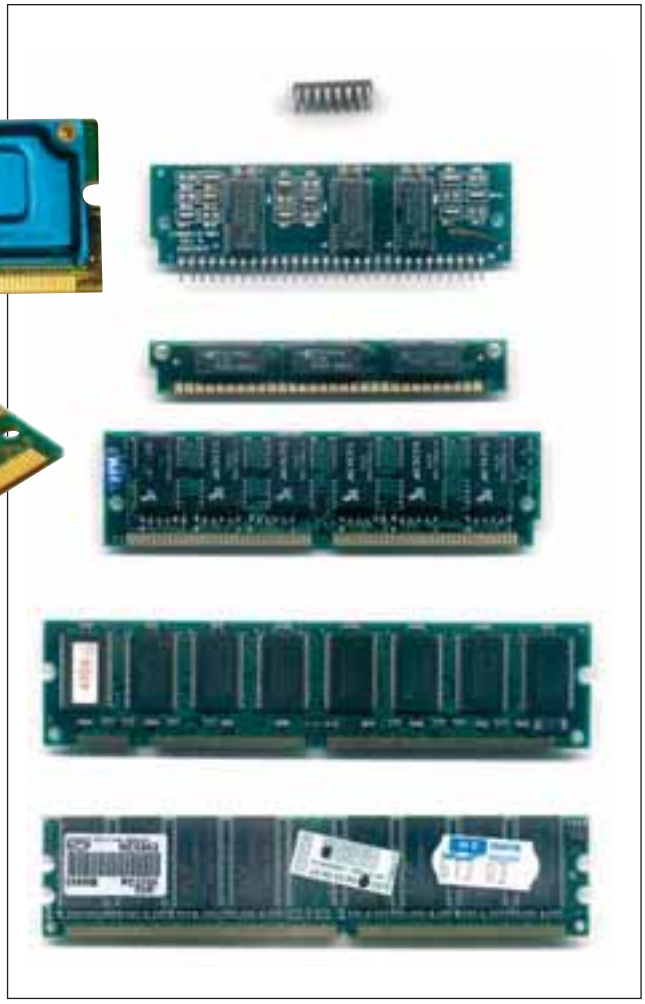


These DDR Dimms show the different notch locations. From top to bottom: DDR, DDR2 and DDR3 modules

Rambus Rimm modules were used in some early Pentium 4 PCs



SO-Dimms are used in most modern laptops



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72-pin Simm
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184-pin DDR Dimm

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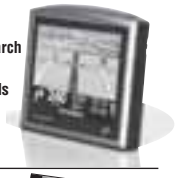

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Have a break get a hobby

Robin Nixon presents a comprehensive round-up of hobby-related PC and internet resources

Having downloaded tens of dozens of programs and viewed hundreds of websites, here's a selection of the very best hobby-related resources. Whatever your interests – from the sciences, to animals, arts and crafts to outdoor activities, digital media or food and drink – there's bound to be something for you.

It doesn't matter how busy we are, maintaining additional interests outside our day-to-day preoccupations is always a good idea, if only to keep our minds active. Just as taking a well-earned holiday can often recharge our batteries, so does making time for a hobby. In fact, having a hobby is probably much better for your health than vacationing, as most hobbies can be enjoyed on a regular basis.

It's now well understood that hobbies can provide many hours of relief from stress and can also boost our creativity, self-esteem, passion, pleasure and accomplishments. In particular, it's also possible – if not medically proven – that even simple activities such as reading, playing cards or board games and doing crossword puzzles may prevent or minimise memory loss as we grow older. So hobbies are not only fun, they can also be good for our health, too.

To help you find some starter resources for a selection of popular hobbies, we've divided them into broad subcategories, and whether they are a website or a downloadable program available is indicated by the following keys: Website, Windows, Mac and Linux.

Google Sky is the perfect companion for the amateur astronomer, or anyone interested in studying the skies

SCIENCE & ASTRONOMY

Electronics Assistant (Windows)
www.electronics2000.co.uk

This program provides 2,000 online calculators and more in a standalone application. It converts resistor and inductor colour codes, calculates LED series resistors, capacitance units, series/parallel resistors and capacitors, frequency, reactance and more.

Fun Science (Website)
www.funsci.com/texts/index_en.htm

This website shows how to build scientific equipment from relatively cheap materials. Projects include instructions for making telescopes, microscopes, batteries, sidereal indicators and several other instruments.

Google Moon (Website)
www.google.com/moon/

Based on the popular Google Maps interface, Google Moon has three modes: Apollo mode provides information about each of the Apollo missions; Visible mode provides satellite imagery for the Moon; and Elevation shows a false colour rendering of the Moon's elevation.

Google Sky (Website)
www.google.com/sky/

Also based on the Google Maps interface, Google Sky shows a sky view created from a collage of Hubble Telescope space photographs. The website offers multiple layers of viewing and a selection of featured observatories.

Robot.org.uk (Website)
www.robot.org.uk

A guide for robot builders detailing how to build robots for Techno Games, Robot Wars, Micromouse, the Robot Olympics, Robotix, the Great Egg Race, Robo Festa, Waste Watch and student projects.

Stellarium (Windows/Mac/Linux)
http://stellarium.org

Stellarium shows a realistic sky in 3D, just as if you were looking at it with the naked eye, binoculars or a telescope. It displays stars, constellations, planets, nebulas and others things such as the ground, landscape and atmosphere.

PETS & ANIMALS

Bird Watcher Professional (Windows)
www.rb59.com/bwpro

A great bird-watching companion program featuring date and time of sightings, bird names, numbers, location, sighting rank and field notes. This used to be a commercial program, but is now entirely free.

Whether you keep chickens or larger animals, this website has plenty of useful information

Country Smallholding (Website)
www.countrysmallholding.com
The website for *Country Smallholding* magazine is packed with information about looking after cattle, horse, goats, pigs, sheep and other animals, as well as advice on organic farming, cooking and living.

Lao Tzu's Animal Register (Windows) www.animalregister.net
If you breed pedigree pets for fun or commercially, here's a program that keeps track of all your animals and prints pedigrees and cage labels for them. It supports up to 100 animals free, or more if you register.

Pet Web Site (Website)
www.petwebsite.com
This site has everything you could want to know about small pets such as cats, dogs, hamsters, fish and reptiles. The forums are frequented by experienced pet owners happy to answer your toughest questions about pets and pet care.

ARTS & CRAFTS

Artrage Starter (Windows)
www.pcw.co.uk/2168366
By providing realistic tools, such as oil paints and pencils, and simulating the real-world dynamics of those media, Artrage enables any user to play around with paint, without the expense and mess.

British Origami Society (Website)
www.britishorigami.info
With everything from tips and techniques to diagrams and data, this is the website to bookmark if you enjoy origami. The site includes an online gallery, as well as fun models and puzzles. It also keeps you up to date with the latest origami events.

Get Woodworking (Website)
www.getwoodworking.com
This website features an ever-growing number of articles, as well as product reviews, late-breaking news and lots of user-generated content. There are also how-to features, construction guides, competitions and a host of other features.

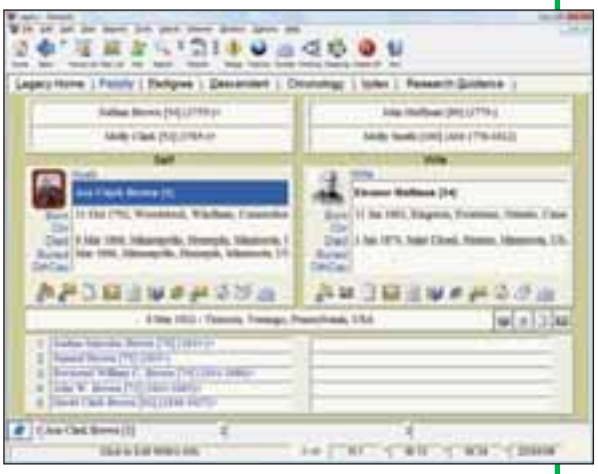
Learn Calligraphy (Website)
www.learncalligraphy.com
If you love beautiful handwriting, then this is a great site for you. It features tutorials (whether you are left- or right-handed), covers different alphabets, shows how to plan a work of calligraphy and more.

Free Patterns Online (Website)
www.freepatternsonline.com
Cross-stitching and quilting hobbyists will enjoy all the free patterns on offer at this

Who do you think you are?

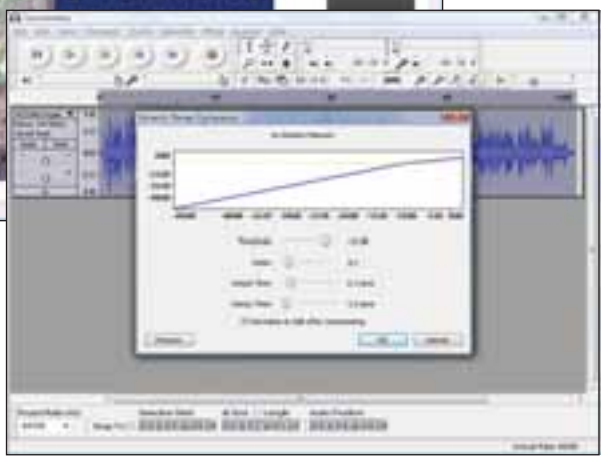
Helped by the advent of the internet and the ease of research it provides, researching family trees is one of the fastest-growing hobbies, as people try to discover as much as they can about their ancestors.

Legacy Family Tree (**www.legacyfamilytree.com**) is an application packed with features. Use it to map your ancestors around the world using Microsoft Virtual Earth to track their migration. It lets you create graphical charts – ancestor, descendant, fan, hourglass, bow tie and even DNA charts. You can cite your sources with easy-to-use templates to help you prepare properly formatted sources, and it even comes supplied with a collection of suggested questions for interviewing your family. There's a limited free version available to download, or you can buy the Deluxe version for $29.95 (around £20), which gives you access to all the above features.



If you are serious about studying your family tree, Legacy has everything you need to get started

Gardeners' World from the BBC has everything the keen gardener could want



The audacity audio editor has every feature you could ask for from a sound editor

website. There's everything from borders and logos to alphabets and numbers, as well as monograms, floral designs and seasonal patterns.

Photography.com (Website)
www.photography.com
An excellent web destination for amateur and professional photographers alike. It features a wealth of helpful hints, tips and hands-on articles, and it allows you to share your photos online in specially constructed portfolios.

UK Hand Knitting (Website)
www.ukhandknitting.com
The official website of the UK Hand Knitting Association, where you can meet up online with other knitters and crocheters, participate in shows, enter competitions, obtain free patterns and generally participate in everything going on.

OUTDOOR ACTIVITIES

Driving (Website)
www.driving.co.uk
If you enjoy driving, this site has plenty for you – from learning to drive and taking the test, to advanced driving skills, driving as a career and driving issues such as safety, fatigue and road rage. It also has plenty of background information on driving.

Gardeners' World (Website)
www.gardenersworld.com
From the BBC, this is the definitive website for UK gardeners. Offering information on things such as flowers, fruit and vegetables and greenhouses, as well as providing general tips for around the garden and a week-by week planner, it's comprehensive and clear, so you know you're getting the best advice.

UK Campsite (Website)
www.ukcampsite.co.uk
Perhaps the biggest UK guide to all things camping and caravanning, this website offers information on tents, caravans, motor homes and trailer tents. It contains messageboards and lists more than 7,000 campsite reviews.

Walking and Hiking (Website)
www.walkingandhiking.co.uk
Whether you're planning a short stroll through the woods or a five-peak challenge, this site offers great tips and information on keeping fit and safe. All its features and articles are written by experts with years of experience offering tons of advice.

DIGITAL MEDIA

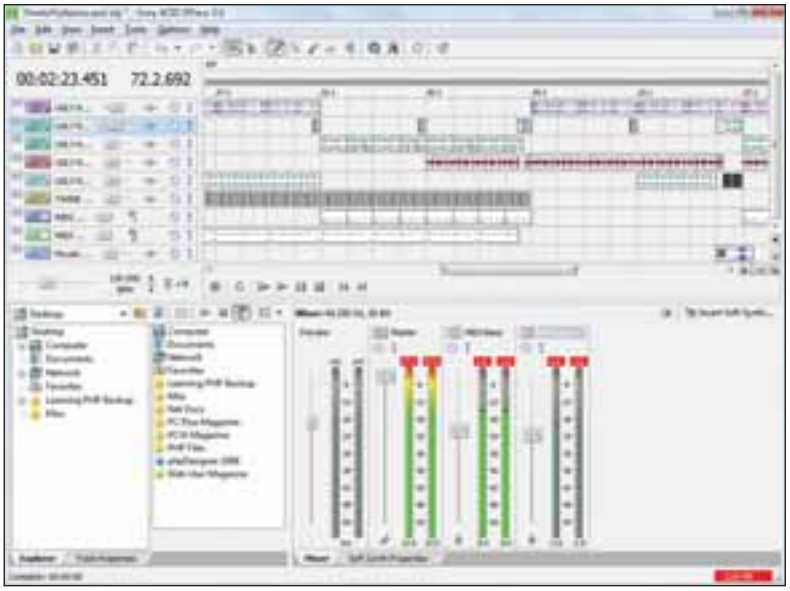
Audacity 1.3.6 (Windows/Mac/Linux)
http://audacity.sourceforge.net/download
Whether you need to create and edit audio for family video soundtracks, your local hospital radio station or just for fun, Audacity comes with an amazing collection of features you would normally only expect from a high-priced commercial program.

Windows Movie Maker (Windows)
www.free-codecs.com/Windows_Movie_Maker_download.htm
Microsoft's free movie editor is pre-installed on Windows Vista, but you can download it for XP at the URL above (Microsoft has removed it from its website). The program offers a comprehensive suite of video transitions, effects and other invaluable features.

Pencil 2D animation software (Windows/Mac/Linux)
www.les-stooges.org/pascal/pencil
Pencil is an animation program for 2D animation that lets you create traditional hand-drawn cartoon animations using both bitmap and vector graphics. It supports layers and timelines, and also incorporates sounds.

Photomax Pro (Windows/Mac)
www.hdrsoft.com
If you enjoy photography and want to try your hand at High Dynamic Range (HDR)

Packed with hundreds of mouth-watering recipes to try



Acid XPress: this loop-based music production tool is impressive

imagery, then Photomax will let you do this by incorporating differently exposed photos into a single HDR photo. This is a fully working trial with watermarks in some modes.

FOOD & DRINK

Cooking Bread (Website) www.cookingbread.com
Whether you use a machine or enjoy making bread by hand, this website has all the recipes, hints and tips you could want. With detailed instructions and beautiful photographs, you'll learn how to take your hobby to the next level.

Easy Recipe Deluxe and Wine Library (Windows) www.wensoftware.com
Two fast and easy-to-use database programs. Both are free to use for 30 days. The recipe program comes with 1,300 superb recipes already loaded and the ability to add thousands more, while the wine program helps you manage a wine collection.

Taste Spotting (Website) www.tastespotting.com
Page after page of beautifully photographed meals, showing how good food should be prepared. When you see one you like, click it for the full description and recipe. You can also upload your own photographs and recipes to share with others.

Wine Pages (Website) www.wine-pages.com
This is an online wine magazine published by wine writer Tom Cannavan. It houses a vast repository of wine information, consisting of many thousands of pages, and also includes popular forums, quizzes, competitions and events updates.

Home Beer Making www.homebeermaking.co.uk
How do you fancy brewing your own beer for around 15p a pint? If that sounds enticing then all the information you need to get started is at the Home Beer Making website. According to them, "If you can make a cup of tea, you can brew a pint of beer."

CREATIVE ARTS

Acid XPress (Windows) www.sonycreativesoftware.com/download/trials/acidxpress
A free version of Sony's award-winning music-creation tool. Create your own original music using a pick, paint and play interface. Just pick some loops, paint them into a track and play your music back. It also features an integrated tutorial.

Internet Juggling Database (Website) www.jugglingdb.com
This online resource for juggling and other circus arts features animations, videos and tutorials to help you develop your skills. It has all the latest details on festivals and events, and lists all the juggling clubs nearest you.

Magic Hat (Website) www.magichat.co.uk
Whether you are a beginner looking to start out, an amateur looking to polish off your routine, or a seasoned professional looking for that certain trick, this is the right place for all your magic needs.

The Acting Website (Website) www.theactingwebsite.com
This is a site for amateurs and professionals alike. It features an entertainment directory and lists of agents and managers, casting call details and a comprehensive collection of resources, such as where to get acting and singing lessons.

Ywriter (Windows) www.spacejock.com/yWriter4.html
Are you a budding novelist? This powerful word processor will break your novel into chapters and scenes, enabling you to concentrate on writing. The program will keep track of the details because you simply flesh out the book as you go. **PCW**

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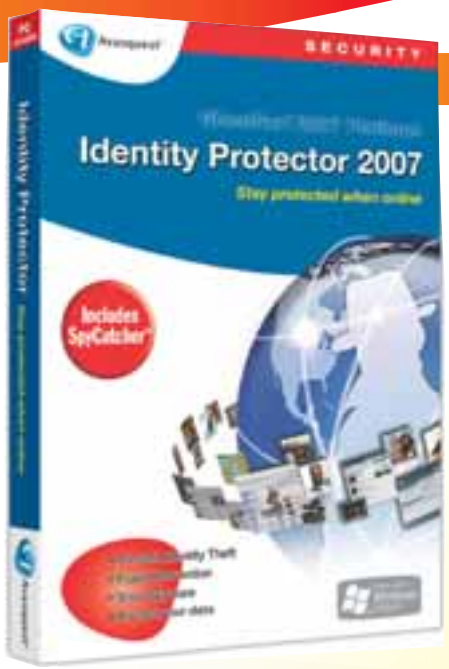

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EDITED BY
NIGEL WHITFIELD

REVIEWS

LITTLE AND LARGE

It seems like just about everyone is making netbooks these days; we've a round-up of some of the latest models in one of this month's three group tests, including a new 'premium' model from Asus, the company that started it all.

The perfect companion to a netbook, perhaps, is mobile broadband. In fact, some providers will even give you a free netbook if you subscribe to their broadband service. Another of our group tests this month finds out if 3G broadband really can compete with a fixed line.

These are interesting times at the other end of the PC market too, and in this issue we have a group test that looks at some of the first PCs powered by Intel's new Core i7 processor, alongside some of the best performing of the current range of chips, to see how much of a performance boost you can really expect from i7.

On 1 December 2008, the standard rate of Vat was reduced to 15 per cent. Please note that some quoted prices in reviews may include or assume Vat at the old rate of 17.5 per cent.

CONTENTS

HARDWARE
56 Shuttle X27D

PERIPHERALS
57 T-Mobile G1
58 Archos 5 with DVR Station
59 Nokia N96
Lexmark X5650
62 Logitech Digital Video Security System
Devolo DLan 200 AV Wireless G Starter Kit
63 Terratec Noxon iRadio Cube
Iomega Storcenter ix2 2TB

ACCESSORIES
64 Antec Skeleton
Asus P6T Deluxe
Ixos XMM238 Cube
Shure SE102 Earphones

SOFTWARE
65 Ashampoo Photo Commander 7
66 Webroot Internet Security Essentials
Uniblue Driver Scanner 2009
67 Filemaker Bento 2.0
Abbyy Fotoreader

GAMES
68 Left 4 Dead
69 How we test

BEST BUYS
70 Best Buys

GROUP TESTS
78 Enthusiast PCs
90 Mobile broadband
101 Netbooks

Prices include Vat unless otherwise stated

OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.
Recommended: A product that combines great features, usability and value for money.
Great Value: Not the best in class, but a product that has superior features and performance for the price.
Best Buy: The best product in its class in terms of performance, features and value for money

'These Core i7 systems are stunningly fast, stylish, well-featured and surprisingly quiet PCs that offer a good degree of future-proofing'

Read the group test on page 78

BAREBONES DESKTOP PC

Shuttle X27D

A system that muddies the waters between low-end and regular PCs

Performance sits between the single-core Atom and low-frequency Core 2 Duo

Shuttle has broken with tradition with its new X27D barebones by bundling a processor – Intel's new dual-core Atom – as well as the case, motherboard and power supply.

We've had no complaints about the meagre performance Intel's single-core Atoms provide so far, since they're cheap and draw little power. The new Atom 330 remains a frugal desktop processor, even if its Thermal Design Point (TDP) has doubled to 8W compared with its 4W Atom 230 predecessor (which is much higher than the Atom N270 for laptops, with 2.5W TDP). The TDP, which equates to its energy consumption, would probably have been lower if this were a native dual core. Instead, the Atom 330 contains two separate processor dies.

It continues to operate at 1.6GHz, while the extra core means Level 2 cache has been doubled to 1MB. Intel has also added 64-bit support to the Atom 330, although that doesn't benefit the Shuttle X27D, which has a 2GB Ram limit.

Overall, our benchmarks show that its performance sits between the single-core Atom and low-frequency Core 2 Duo. Performance doesn't improve in applications that aren't multi-threaded, but in our multi-core Cinebench test performance increased 85 per cent, while performance went up 37 per cent in our PCmark05 CPU test over the single-core Atom.

The Atom 330 has a similar TDP to a 1.2GHz Core 2 Duo U7600, but is half the speed in our Cinebench 9.5 tests and a third slower in PCmark05's CPU test. Vista operation is sluggish and the dual-core Atom can be justified in low-cost devices only.

The Shuttle X27D's physical design is impressive. It's a compact, all-metal chassis, with ventilated sides and an external power brick. A solitary fan whirs quietly inside below a removable metal caddie that can only accommodate a laptop-size 2.5in hard drive and slimline optical drive. Externally you get DVI and VGA ports, as well as six USB ports and analogue surround-sound 3.5mm jacks.

Our X27D, fitted with a 5,400rpm hard drive and 1GB of Ram but no optical drive, idled at 25W and drew 28W under load. This is an excellent result and only the Eee Box B202 (**www.pcw.co.uk/2224975**) and PCs using laptop Core 2 Duos (such as the Novatech Solo Pro **www.pcw.co.uk/2222542**) are as efficient.

Windows XP works a treat on the X27D and its small form factor, low energy consumption and near-silent operation also make it an excellent candidate for Windows Home Server (WHS) to share files and back up PCs. Just like most XP drivers, Shuttle's drivers installed perfectly on WHS and performance, thanks to the X27D's Gigabit port, which was very good.

Our main grumble with the X27D is its price, especially if you plan to buy a copy of Windows XP for it. Microsoft allegedly sells XP for $32 (around £22) per unit for low-cost laptops and desktops such as the Eee PC and Eee Box, as long as they only have a single core. The dual-core CPU in the X27D, therefore, makes it ineligible for cheap XP, which leaves Ambros selling regular XP for the X27D at £82.

If you have to buy components as well (shopping about will buy 1GB of Ram, a 120GB hard drive and a DVD writer for about £80), the X27D is considerably more expensive than the £200 Eee Box. That said, the X27D has better build quality, slightly better performance and a simple layout that makes upgrading and changing components a doddle. *Emil Larsen*

Performance

PCmark05 CPU **1,953**

Cinebench 9.5 multi-CPU **240**

Verdict

Pros Low power consumption; great construction; good choice for WHS
Cons Very expensive; can't accept desktop-size optical and hard drives
Overall A well-built, attractive barebones, but pricey once you've bought components

Features	★★★★☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £199

Contact Ambros 020 8861 2223 www.ambros.co.uk

Specifications Intel Atom 330 processor 1.6GHz 1MB L2 cache 533MHz FSB • Intel 945GC+ICH7 Express Chipset • Intel Graphics Media Accelerator 950 • Realtek ALC 662 six-channel audio • Realtek 8111C Gigabit Ethernet • External 60W power adapter • One DDR2 Dimm • Two Sata • One Pata • 2.5in bay • Slimline optical drive bay • DVI • VGA • Six USB ports • 185x250x70mm (wxdxh) • Two-year C&R warranty

SMARTPHONE

T-Mobile G1

The Google phone lands in the UK

Google's Android phone system has been keenly awaited for some time now, and it has made its first appearance in the UK in the shape of the T-Mobile G1, manufactured by HTC. It's a similar size to the iPhone, though somewhat thicker, with a large screen and a panel below sporting five buttons and a small trackball. This is angled slightly forwards – though whether it makes any difference to sound quality is debatable. The keys are for dial, home, back and end, plus menu – which you'll be using a lot. The rest of the interface is managed through the touchscreen, though it doesn't support multi-touch gestures.

The battery is charged through a mini USB port on the bottom, covered by a plastic flap. Startup time was lengthy – and at around a minute you'll prefer to keep the G1 charged and running, if you can.

Setup was simple: enter your Google account details and your address book will be synced automatically. You can even use the Gmail application to check your messages.

That was about the first thing we did, and also the first inkling we had that rather than being a great phone this is more like a work in progress. As with many applications on the phone, pressing the physical menu button displays a row or two of icons at the bottom of the screen for common tasks. One of these will be a 'more' option, popping up a longer on-screen menu through which you can scroll with your fingers, then highlight a message. You can also go straight to this menu by holding down your finger on a message until it pops up – pretty standard fare, so far.

What's annoying is that – as many Gmail users will know – you have to spend a lot of time marking messages as junk. So, why not put that option on the short menu, so you press the physical key and then tap the Junk button? Instead, it's the last option on the pop-up menu, so scrolling is inevitable. It's the sort of simple UI mistake that becomes irritating very quickly.

Other email accounts are supported, though some users report problems with mailboxes updating. Our complaint is somewhat different: mobile access to every Imap folder on the server is great, but if they're in a hierarchy, they should be shown in a hierarchy, complete with collapsible folders rather than as a very long list to scroll through – 150 items in our case.

The G1 has no on-screen keyboard, aside from the numeric pad for dialling numbers. For texts and emails, you have to open the screen. It moves slightly towards the top, then to the right, leaving you to turn the device and use the thumb keypad in landscape mode. It's a reasonable keypad, and you can get up a decent speed typing, but it's not always convenient, so we'd like to have seen the option of an on-screen keypad.

There's a rear-facing camera, though no front one for video calls, and a dedicated shutter button on the side. It's none too quick to start up, and you'll need pretty good light to avoid grainy photos. We've seen much better, including on Nokia's N series handsets. After snapping, an on-screen menu gives you the option to send by email, among other things. But while you get a blank email with the photo attached, you can't simply scroll through the address book – you've got to open up the keyboard and type instead.

There are, of course, good points: the interface is easily customisable, and you can have different sections of the home screen, scrolling from one to another, perhaps to differentiate work from play.

Installing apps via the online store is easy, as is web browsing, and using the built-in GPS, which found our location extremely quickly. And given the Linux base of the system, many of the quirks and niggles may well be addressed by ports of better applications.

But considering that Google's phone platform has been treated in some quarters with the near-messianic zeal usually reserved for Apple products, we expected better – better battery life, a more responsive touchscreen and far fewer loose ends with regards to user interface. To be fair, this is the first phone with the Android operating system, so glitches aren't completely unexpected. It'll probably be very good when it's finished. *Nigel Whitfield*

The interface is managed through the touchscreen, though it doesn't support multi-touch gestures

Verdict

Pros Good screen; usable keyboard
Cons Slow startup; rough edges to the interface; poor camera
Overall A competent smartphone, but it shows signs of having been rushed. Interface niggles preclude a recommendation for now

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★★☆
Overall	★★★☆☆

Price £free on £40 per month

Contact T-mobile
www.t-mobile.co.uk
Specifications Android operating system • 158g • 117.7x55.7x26.5mm (hxwxd) • GPS and digital compass • 3G and Wifi connectivity • Three-megapixel camera • Bluetooth • 3in touchscreen • Qwerty keyboard and trackball

PORTABLE MEDIA PLAYER

Archos 5 with DVR Station

A slim but pricey device with excellent features

An excellent-quality display, with superb colours, sharp lines and effective contrast

The Archos 5 is the latest in an award-winning series of portable media players that many use as the yardstick against which competing devices are measured. This time around Archos has ditched the optional tactile controls alongside the display in favour of touchscreen-only operation. This allows for a large 4.8in 800x480 LCD and, in fact, the only controls around the exterior are an on-and-off switch and volume. There's a kick-stand for propping it up, but no stylus. This isn't too much of a problem when navigating menus, as the interface is intuitive and makes it easy to browse the various features. When it comes to keyboard-specific functions such as browsing the internet, this becomes more of a problem and we can't quite understand why there isn't something provided to offer a bit more precision.

Archos 5 has an excellent-quality display. This carries through to movie and photo viewing, where colours are superbly accurate with sharp lines and effective contrast. Audio is also improved over previous versions and is on a par with the more impressive MP3 players currently doing the rounds. We were impressed by the degree of control available when viewing media, which includes aspect ratio, slideshow creation, playlist creation, thumbnail views for all media and more.

There are a few notable changes from the way Archos has presented the device to consumers over previous versions. Unfortunately, the plug-in system still persists, but it has been refined so that many key features are now included by default. Format support is better out of the box, though you'll still need a plug-in for MPEG-2/VOB formats with AC3 sound and for H.264 video. Web browsing is available as standard, along with internet radio and web TV channels.

As well as plug-ins, the ccArchos 5 can be upgraded with a range of accessories, such as a helmet camera, Freeview tuner, GPS dock and FM receiver. We couldn't get hold of all these, but did manage to test the most useful – the DVR station. This is a pass-through device that sits between a TV and receiver box, enabling its functionality as a personal video recorder (PVR). There have been a number of improvements here, such as the ability to download a full programme schedule relevant to your existing setup and an HDMI port for high-definition output. Unfortunately, the device isn't capable of playing HD content yet, though there is an HD plug-in in the works.

We were disappointed not to see an HDMI in and out, since you will lose signal quality by passing content through Scart to the DVR station. However, connecting the device to a TV using component or HDMI results in better picture quality. At this point, it's possible to record programmes directly to the internal drive and even set up schedules using the programme guide, with options for adjusting recording quality.

In addition to setting up Archos 5 as a PVR, you'll also be able to make better use of its wireless facilities by browsing the web via your TV or, more importantly, streaming media from a computer. Unfortunately, it requires use of WMP11's UPnP media sharing, which can hog your computer, but we were impressed by the quality and responsiveness of playback.

Archos 5 is capable of most functions you would expect from a portable media player. Despite the excellent audio and video performance, and unrivalled potential, its price over previous versions means you'll have to get quite a bit of use from the features to consider it a worthwhile investment. *Paul Lester*

Verdict

Pros Excellent touchscreen display; impressive media control; slim design
Cons Pricey; expect to pay more for plug-ins and add-ons; no stylus
Overall Despite excellent features and performance, Archos 5 is more expensive than previous models

Features	★★★★★
Performance	★★★★★
Value for money	★★★☆☆
Overall	★★★★½

Price £279.99 (60GB); £320 (120GB); £360 (250GB); £79.99 (DVR Station); £12.49 (plug-in)
Contact www.archos.com
Specifications 800x480 pixels, 4.8in TFT LCD • 60-250GB capacities • Wifi (802.11 b/g) • Video support: MPEG-4, WMV (including protected files), M-JPEG • Video support (with plug-in): MPEG-4 (ASP 720p), WMV HD (MP 720p), MPEG-2, H.264 • Audio support: MP3, WMA, Protected WMA, WMA Pro 5.1, Wav, AC3 stereo audio and 5.1, Flac, Ogg Vorbis • Audio support (with plug-in): AAC3 and AAC+ stereo audio files • Image support: JPEG, BMP, PNG, GIF • PDF viewer • Battery life: 22hrs (audio), 7hrs (video) • 127x78x13mm (wxhxd, 60GB model)

SMARTPHONE

Nokia N96

Greatly improved battery life but Symbian flagship upgrade still needs to do more with the browser

Until recently Nokia's N95 was the flagship Symbian phone. Its successor, the N96, certainly has a more modern look – rounded corners and a minimalist almost flat fascia – but it's really just an evolution of the N95. It has the same dual-slide action, but loses the lens cover – you just hold down the shutter to start the camera – and gains a dedicated keylock switch. There's also a more sensible position for the headphone socket on the top of the handset.

The software's had a minor visual update, but will be instantly familiar to Series 60 users, with a more configurable standby screen. The Nokia configuration includes a BBC iPlayer link on the main screen, and it's easy to use, although you'll need Wifi to access it. Much has been made of its DVB-H support, but that probably won't turn out to be of much use in the UK.

Playback of H.264 clips is very good, with a bright, crisp picture; iPlayer downloads are messier, but that's the BBC's bit rate, more than the phone.

Battery life is much better than the N95. Even with some video playback and Wifi use, you can go more than two days between charges.

But there are niggles. The phone's not really any faster than the N95, and the new keypad is too smooth for our liking, with the application and cancel keys a bit small. And when you're playing video, the keypad dims, so you can't see which is the pause button. The rear cover comes off for access to the battery, resulting in a slightly cheap plastic feel when you grip the phone.

The RSS reader is useful, but the web browser still compares poorly to other platforms. Sometimes we had to force the screen to change orientation and back again to redraw pages so they could be read. And, while there is Imap support, it's not as comprehensive as we'd like to see.

The N96 is a good phone but it's up against stiff competition, and it doesn't shine. Nor does it do enough, aside from better battery life, to address the niggles of its predecessor. *Nigel Whitfield*

Verdict

Pros BBC iPlayer support; lots of add-ons; better battery life than N95

Cons Keypad cramped and too smooth; browsing experience lags behind competition

Overall Good performer with lots of features, but not a compelling upgrade

Features	★★★★★
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★★☆

Price From free on contract, £490 Sim free

Contact Nokia, 0800 331 6021 http://shop.nokia.co.uk

Specifications Symbian 30 v3.2 • 2.8in QVGA screen • 3G, HSDPA, quad-band GSM • 16GB flash • Bluetooth • 802.11b/g • Imap and Pop3 email • Five-megapixel camera • Front VGA camera • A-GPS with three months navigation included • DVB-H tuner • H.264 video playback • 55x103x20mm (wxhxd) • 125g

MULTIFUNCTION DEVICE

Lexmark X5650

An MFD packed with features but which still ticks the budget box

With print, scan, copy and fax functions, Lexmark's X5650 certainly isn't lacking for features. Setup didn't cause any problems, although it was disappointing to have to finish off the printer assembly by sticking the English labels on the buttons; Lexmark includes labels for a wide range of languages.

The X5650 looks more functional than stylish, but Lexmark has done a good job keeping it compact. Sat on the top is an ADF (auto-document feeder), which makes faxing and copying multiple documents a snip, although the feeder can only hold 25 pages at a time. A multi-format card reader sits just to the left of the large control panel and is accompanied by a USB port, so it's possible to print without a PC.

Lexmark has made a big song and dance about its commitment to Wifi over the past couple of years, so it was something of a surprise to find the X5650 doesn't support wireless networking. Instead, you're left with a simple USB connection.

During testing, the X5650 didn't astound us with its speed, taking just over one minute 30 seconds to print a 6x4in photo. Standard-quality text documents were produced at a rate of around 5ppm (pages per minute). Freshly printed pages smudged very easily on cheap paper; switching to more expensive Lexmark stock solved this problem.

The X5650 produced some surprisingly good photo prints with rich, deep colours. Those with an eye for detail will want to look elsewhere, but for the majority of home users the prints will be perfectly adequate.

Loaded with features and capable of decent prints, the X5650 certainly justifies its price tag. But shop around: you should be able to find it for under £60, which is a real bargain. *Will Stapley*

Verdict

Pros Fax and ADF included; reasonably print quality; price

Cons Photo prints lack fine detail; text smudges easily on cheap paper

Overall With a raft of features and decent overall print quality, this is a good-value MFD

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

Price £99.99

Contact Lexmark 08704 440044 www.lexmark.co.uk

Specifications Inkjet MFD • Four-colour printing (six-colour with Photo cartridge option) • 1,200x1,200ppi scanning • 18ppm (draft) • 25-page ADF • USB • Multi-format card reader • 465x295x205mm (wxdxh) • 7.5kg • Three-year warranty

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HOME SECURITY SYSTEM

Logitech Digital Video Security System

Home and office surveillance equipment that is easy to install

Logitech's Digital Video Security System is a suite of home or office surveillance products promising plug-and-play installation, as the cameras link up when plugged into the mains. As a minimum, you need a £249 master pack comprising an indoor or outdoor camera and a Homeplug data-over-mains adapter that connects to your PC's USB2 port. You can add up to five more cameras at a cost of £199 each, either indoor or outdoor.

All the cameras come with mounting brackets. The indoor model also comes with a sucker pad for attaching it to a window. It can face either way – so it can give an outside view as well.

The outdoor camera comes with a 4m cable; less sensible is the use of a sealed plug, which will have to be cut off if you need to pass the lead through a hole in a window frame. The data connection is not guaranteed: our host PC could not see a camera fitted in one electrically noisy room.

System setup via the Wilife Control Centre software is easy, provided you know your email server address. The system records only when it detects motion, which can trigger an email alert, or a text message if you use an email-to-SMS service. You can view all cameras live over the web.

Network drives are not supported. For off-site video storage you are encouraged to subscribe to Logitech's platinum service. This also gives you scheduled monitoring, remote viewing of stored video, remote control, PC pop-up alerts, and digital pan tilt and zoom. These functions could be replicated in a subscription-free standalone system but, given no-brainer surveillance at relatively small cost, many subscribers won't care. *Clive Akass*

Verdict

Pros Easy installation
Cons High online storage costs
Overall The subscription-free system is good enough for many purposes

Features	★★★★☆
Performance	★★★★☆
Value for money	★★☆☆☆
Overall	★★★☆☆

Price £249 Master kit

Additional cameras £199 each. Platinum service with 50MB storage £49. Extra storage: £25 for 500MB; £59 for 2GB; £179 for 10GB (per year)
Contact Logitech 01753 870 900 www.logitech.co.uk
Specifications Resolution 640x480 • Frame rate up to 15 per second • Focus preset • Viewing angle 80° • 1.4GHz CPU for single camera • 1,024x768 • 600MB hard disk space for code and storage • Vista or XP Home, Professional or Media Center Edition

WIRELESS NETWORKING KIT

Devolo DLan 200 AV Wireless G Starter Kit

A simple way to extend your wireless network

Wireless networks are ideal for sharing internet access around the house, but there are often places where the signal from a single router just won't reach. There are many ways to extend a wireless network, and this kit from Devolo is one of the simplest we've seen.

The kit includes a wireless router with built-in Homeplug networking, a small Homeplug unit and an Ethernet cable. Setting the whole thing up is easy: we plugged the router in at one end of the house, hooked up the Homeplug adapter to our main wireless router using the Ethernet cable, then plugged it in nearby. By the time we got back to the router, it was connected, providing an unencrypted wireless network with internet access via the remote Homeplug.

So far, so good, but we wouldn't recommend anyone to leave their network in such an insecure state. Securing the Homeplug link is simple enough, requiring you to press a button on the router and Homeplug within a few minutes of each other. Adding wireless encryption isn't much harder. Devolo includes a CD with utilities to track down its router on the network and open the configuration interface, but anyone with a basic understanding of networks will be able to tap the right address into a web browser and get going straight away.

The web configuration interface is pleasantly simple, with a few key options on every page, and it doesn't take long to password-protect both the router and the wireless network (Wep, WPA and WPA2 are supported).

At around £140, this kit isn't cheap, but you could easily spend £80 on a similar Homeplug link and £50 on a wireless router, so you're only paying £10 or so for a neater, easier solution. *Tom Royal*

Verdict

Pros Incredibly simple to set up; neater than connecting a separate router via Homeplug
Cons More expensive than buying separate Homeplug parts and a router
Overall A simple, elegant way to add wireless internet to a remote part of your home

Features	★★★★★
Performance	★★★★★
Value for money	★★★★☆
Overall	★★★★★

Price £140

Contact Devolo www.devolo.co.uk
Specifications Homeplug AV (200Mbits/sec) and 802.11g (54Mbits/sec) networking • Wep, WPA, WPA2 encryption • Adapter has one Ethernet socket • Router has four Ethernet sockets • Supports XP, Vista (32-bit, 64-bit), Mac OSX, Linux

INTERNET RADIO

Terratec Noxon iRadio Cube

A small, smart internet radio

Terratec's Noxon iRadio Cube is, as you might expect, an internet radio. On the other hand, it's not actually a cube: it measures a slightly wonky 130x140x130mm. The white-on-black display looks good if you're close enough to read it, though, and the device also doubles as an alarm clock.

The iRadio can connect to both wired and wireless networks. Wireless setup is pleasantly simple: after selecting your wireless network from a list, you need only type in the network key using the remote control and choose whether or not to use DHCP. Once this is done, you're ready to start listening to the FM radio or internet stations.

Radio stations are easy to select using the four-way pad on the front of the device, and a dial quickly adjusts the volume. Stations are listed by genre and location, and there's also a category for popular ones. A podcasts menu allows you to listen to the latest recorded shows, with the selection from the UK including programming from the BBC, Classic FM and the *Financial Times*, among others.

The iRadio also works as a music-streaming device, and the CD includes a copy of the Twonky Media UPnP server to run on your PC. Twonky Redial isn't the friendliest media server program, but it's highly configurable and runs unobtrusively in the Windows system tray. New computer users might struggle to get the best from it, but anyone who can configure a wireless router via its web interface should find the server's web configuration system similar.

Sadly, playing music shows up the iRadio's key shortcoming: sound quality. We didn't expect great things from such a small device, but even so, it's decidedly lacking in bass: spoken word sounds fine, but music lacks punch. An audio out socket on the back makes it possible to connect some better speakers.

Overall, the iRadio works well, but at £180 it's too expensive. We'd save money and grab the beautifully designed Tangent Quattro for £30 less. *Tom Royal*

Verdict

Pros Simple to set up; streams music easily; podcast support
Cons Treble-heavy sound better for speech than music; expensive
Overall The iRadio Cube works well, but at this price we can't excuse the sound quality

Features	★★★★★
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £180
Contact Terratec www.terratec.net
Specifications Ethernet and 802.11g interfaces • WEP/WPA/WPA2 encryption • Supports MP3, WMA, AAC+, WMA10 DRM music

NETWORK STORAGE DEVICE

Iomega Storcenter ix2 2TB

File backup and media streaming in a compact package

External hard disks that connect via USB or Firewire might be a convenient way to add extra storage to one PC, but if you have a couple of computers, they're far less convenient. Iomega's Storcenter ix2 is a small Nas device that adds up to 2TB of storage and makes it easily accessible to several networked PCs.

The Storcenter is small, measuring 8x12.5x20cm, but feels very sturdy and weighs a little over 2kg. The case design is Spartan, with only a Gigabit Ethernet port, two USB sockets and the power socket on the back. There's also a small fan, but the device isn't particularly loud in use. A rather large external power adapter is required.

Setting up the device is easy enough: it leases an IP address via DHCP and the supplied software will find it and start the web configuration process. A few shares are automatically configured. One is designed for media files, and copying files into it makes them accessible via a UPnP network media player. Another is designed for backups and is used by the included EMC Retrospect HD software. Adding extra storage devices is simple: just plug them into one of the USB ports.

The Storcenter's web interface is simple enough to use, allowing you to add users, create new shared drives and perform maintenance operations, but for some operations you need to use the included client software running on a PC instead. We also liked the fact that, by default, the device is set up to provide 1TB of storage with Raid 1 mirroring, so even if one of the two disks inside fails, your files will be safe.

All in all, the Storcenter does a simple job well enough. It's not pretty or cheap, but it is easy to set up and provides both mirrored backup storage and a handy media server. *Tom Royal*

Verdict

Pros Simple; provides mirrored storage; media server works well
Cons Large power supply; can pick up a non-mirrored 1TB Nas far cheaper
Overall A simple, if fairly expensive, way to add 1TB of secure network storage for backups

Features	★★★★★
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

Price £318
Contact Iomega www.iomega.co.uk
Specifications 2TB Nas • Two 1TB disks • Gigabit Ethernet and two USB ports • Supports Raid 1 • JBOD, UPnP media server

Antec Skeleton

Price £119.43 **Contact** www.techstore.co.uk **Overall** ★★★☆☆

Antec's latest open-air enclosure is for people who love to tinker with their systems and think a standard case just gets in the way of all the fun.

It's hard to describe the Skeleton. In the home it will soon become a dust trap, and while the hardware tray is well engineered and slides out of the main frame, it does so from the rear: giving it the clearance room it needs may well present a problem. The fan mount for the main 250mm cooling 'Big Boy' fan restricts the use of many of the more commonly used third-party CPU coolers, and many taller high-end graphics cards.

Overall **Although the Skeleton is aimed at a niche market, it's still annoying that the fan frame wasn't raised higher to allow a wider section of coolers and graphics cards** *Simon Crisp*

Asus P6T Deluxe

Price £249.96 **Contact** www.ebuyer.com **Overall** ★★★★☆

The Asus P6T Deluxe is the first motherboard we have seen that supports Intel's Core i7 and X58 chipset technology, and from the outset it was clear that any board using it wouldn't be cheap.

The i7 also uses the larger LGA1366 socket, so you'll need a new cooler as the mounting holes are further apart than with the LGA775. Both the chipset bridges and the voltage regulators are cooled passively.

There are three PCI-E 2.0 graphics card slots, which will allow you to use Crossfire or SLI setups as the X58 chipset supports both. Two of the slots run at full x16 speed, the third runs half-speed at x8.

Overall **Expensive, but if you have the budget then this motherboard would form the basis of a fast, future-proof system** *Simon Crisp*

Ixos XMM238 Cube

Price £12.99 **Contact** www.ixos.co.uk **Overall** ★★★☆☆

This 70mm cube is a portable stereo speaker that comes in pink and white as well as black, and has a 1W amp for each channel. There's a power button on the top, and space for four AA batteries inside, although it can also be powered from a USB port. Audio is fed in via a 3.5mm jack, and both audio and USB power cables are supplied.

The Cube is small enough to pack when you're travelling, so it's no surprise there's not much in the way of bass or stereo imagery. It's not too bad, and manages not to sound too tinny. If you want to listen to music on a mobile phone, it beats built-in speakers.

Overall **Handy for when you don't want earphones, but won't win any prizes for audio excellence** *Nigel Whitfield*

Shure SE102 Earphones

Price £52.99 **Contact** www.shure.com **Overall** ★★★★☆

The earphones that come with most portable music players or phones win no prizes for sound quality, and Shure's SE102 is designed for people who want something better. They're in-ear phones, designed to isolate you from background noise, thanks to rubber bungs that fit snugly in your ear (there are three sizes in the pack).

In that regard they work well, making it possible to listen to some spoken word recordings in noisy surroundings. The sound quality's pretty good, with decent bass and clear treble. But you need to be comfortable with wedging them firmly in your ear as the sound can change a lot if they move around.

Overall **Quality sound, if you like in-ear headphones** *Nigel Whitfield*

PHOTO-EDITING SOFTWARE

Ashampoo Photo Commander 7

Edit and organise your photos

Ashampoo Photo Commander 7 in browser view

Panorama stitching – it doesn't quite measure up

Ashampoo produces a range of software, including security products, disc-burning applications and utilities such as Win Optimizer and Power Up. Photo Commander 7 is a photo-editing application with integrated browser/organiser features.

APC7's welcome screen explains that the user interface is split into four areas – a toolbar, an Explorer-style folder area, a preview area and a content area, which displays thumbnails of what's in the currently selected folder. Other than that, the only practical help you get are tool tips and a basic Help file.

The workspace is busy: there's a lot to fit in and a screen resolution of at least 1,280x1,024 pixels is an advantage. It's easily customisable, though, and a full-screen editing mode gets rid of the clutter, providing only the essentials necessary for editing in pop-out palettes at the screen edges.

Tabs ranged across the top of the screen – Browse, Quick-Fix, Edit, Create and Organize – configure the toolbar directly below with what's needed for the task in hand, but they don't change the workspace layout. Other than when you switch between view, browse and full-screen modes, the only way the layout changes is if you rearrange it yourself.

Most photo editors these days provide tools for organising your image collection. Ashampoo's offering in this respect is dismal. You can apply a star rating to photos and search for them on that basis, or by date.

The date search function is a limited pull-down menu with a few preset options – a day, a month, a year and so on. Other popular photo applications provide sophisticated calendar display functions; that's clearly asking too much here, but the option to search for pictures between two dates would be a start.

There's no means of adding keyword tags to photos either – about the most basic requirement for any photo organiser worthy of the name – nor can you add captions to photos, although if you add this information in another application it will, at least, be displayed in Photo Commander.

A separate Search Files dialogue box can be used to search metadata fields, but the results are displayed as a file list and you can't see images without first adding them to an album, which is clunky to say the least.

A new drag-and-drop virtual albums feature allows you to assign images to collections without duplicating the actual files. This is a step in the right direction but lacks any 'smart' categorisation features. You can't, for example, create albums of all your five-star images. Neither can you rename the contents of albums, so all of your photos are displayed using the file name.

It's not all bad, though. Photo Commander's editing tools include a one-touch optimiser, good colour and tone controls, and a red-eye removal tool. There's a range of filter effects let down only by lack of customisation. Other features worthy of note include a batch editor and creative projects including web photo albums and contact sheets. The new panorama feature was a disappointment, however, merely placing images alongside each other, rather than overlapping them and matching features to create a seamless join.

Photo Commander simply doesn't compete with applications such as Adobe Photoshop Elements, Corel Paint Shop Pro Photo X2; or Google Picasa. It feels a decade old. If Ashampoo is serious about staying the course with Photo Commander it needs to overhaul the interface, add some real organisational tools and find some capable editing features. *Ken McMahon*

Verdict

Pros Has some quite useful batch processing and creative features

Cons Lacks advanced editing; limited search functions

Overall Photo Commander lacks the flexibility and power of the competition

Features	★★☆☆☆
Ease of use	★★☆☆☆
Value for money	★★☆☆☆
Overall	★★☆☆☆

Price £34.99

Contact www.ashampoo.com

System requirements Windows XP or Vista • 1,024x768 16-bit display • 256MB Ram • 64MB hard disk space

SYSTEM SECURITY

Webroot Internet Security Essentials

Webroot offers security, backup tools and more in its comprehensive suite

Webroot is the latest security suite that attempts to curry favour by offering a range of extra features. It offers basic but straightforward operation through the main interface, with a summary of component activity and system status, and each of the tools split into a categorised list.

System scans appear to be effective, though scan times took longer than we'd have liked. Custom and scheduled scans are available and there's an impressive degree of control over which areas of your computer are covered, including archived files, rootkits and specific user account control. A series of shields protect against threats covering the web browser, startup, network, email and system files, with a similar degree of control over the behaviour of each component. These tools work efficiently and come with certification from a number of independent sources, including Virus Bulletin's VB100, ISCA and West Coast labs.

Unfortunately, the same cannot be said of the firewall. Control here is quite poor, with very little in terms of application handling. The automatic mode is not strict enough and, considering this is a fundamental part of any system security, it's a problem that threatens to undermine the entire package. It does offer a few extras, though, such as online backup, which after registration is unlocked with 2GB of virtual drive storage. Local backups are also supported and a wizard-based approach makes these easy to configure.

The clean-up tools are efficient and cover Windows, the internet and third-party applications, with a range of detailed settings for each to control exactly what areas are scanned and cleaned. But the suite does lack some key components, such as anti-spam and parental controls. Webroot offers quite a lot for the money, but the firewall is too permissive, which to some extent defeats the point. *Paul Lester*

Verdict

Pros Effective virus and malware scans; clean-up and online backup included; reasonably priced

Cons Basic operation; ineffective firewall; impact on performance

Overall Despite offering a wide range of tools there are some key omissions, and poor application settings in the firewall are hard to stomach in today's market

Features	★★☆☆☆
Ease of use	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £39.95 (Three PCs, one year)

Contact www.webroot.co.uk/En_GB/index.html

System requirements Windows Vista (32-bit), Vista SP1 (32-bit and 64-bit), Windows XP (32-bit) • 300MHz processor • 100MB hard drive space • 256MB Ram • IE 5.5 or higher/Firefox 2.0 or higher

SYSTEM UTILITY

Uniblue Driver Scanner 2009

Keep your drivers bang up to date with this worthwhile tool

Maintaining a PC's drivers is one of those annoying tasks that's dull but worthy. Although a lot of software application products include automated checks for updates, the same isn't true of hardware drivers, so usually you have to find and download them manually.

Uniblue's Driver Scanner utility promises to change all this by checking for driver updates automatically. It does this by scanning your PC and comparing the driver versions to a database maintained on Uniblue's servers. When it finds newer versions, it can download and install them for you.

The program's interface is fairly uncluttered, although there are a few advertising links trying to get you to upgrade to other Uniblue products. By default, when you start the program all your PC's drivers are scanned for updates – a process that can take several minutes. When the scan is complete, new updates are flagged for each component, and you can choose which ones you'd like to download and install. Our only gripe is that the details of the new driver versions are never made clear to you – you simply hit the download button and it's all done automatically.

We also found that when a driver installation fails, you're not given much info either. You do get a chance to report problematic drivers or ignore them in future scans, however. The only other feature on offer is the ability to back up and restore all your drivers.

Driver Scanner doesn't monitor your system constantly, and there's no built-in scheduling, so you'll still need to remember to run it regularly. Overall it's a worthwhile tool with few competitors. It's priced on a download plus annual subscription basis, although Uniblue says it will still work without program updates if you don't renew it. *Kelvyn Taylor*

Verdict

Pros Simple to use; back up and restore existing drivers

Cons Little detailed driver information; no scheduling feature

Overall Pricey, but worth it to reduce the drudgery of updating drivers

Features	★★★☆☆
Ease of use	★★★★☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £19.95 download, £19.95 annual renewal fee for Active Protection (updates & support)

Contact Uniblue +356 2327 5000 www.uniblue.com

System requirements Microsoft Windows XP or Vista (32-bit) • Intel Pentium 4GHz • 512MB Ram • 500MB hard disk space • 1,024x768, 32-bit colour • Internet Explorer 6 or higher • Internet connection

DATABASE SOFTWARE

Filemaker Bento 2.0

A solid upgrade for this easy-to-use Mac database program

There has never been much in the way of database software for the Mac. With no Mac version of Microsoft Access available, Mac users have been limited to Filemaker Pro, which is a powerful program but, with prices starting at more than £250, is really only suitable for corporate users.

So Filemaker's launch last year of Bento, a low-cost alternative to Filemaker Pro, was welcomed by many Mac-based small businesses and home users who needed a simple database for tasks such as organising client lists, catalogues or club membership records.

Bento 1.0 was praised for its ease of use, but it did have some significant limitations, such as its inability to share data with spreadsheets such as Microsoft Excel or Apple's Numbers. Files imported into – or exported from – Bento 1.0 had to first be converted into .csv format, so one of the most important changes in Bento 2.0 is the simple ability to directly import and export files in Excel and Numbers formats.

When working with spreadsheet data, there's a new Split View option that provides two views of your data at the same time. The upper-half of the screen displays data as a spreadsheet table, while the lower-half displays a form layout for each record. Working with form layouts has been simplified, too. The original Customise mode that was used to design and edit form layouts has been removed, so you can simply click on any field in a form to resize it, or move it around on the page. We also like the ability to link records to emails from Apple's Mail program, which is useful for keeping track of email exchanges with individual clients (though it's a shame this option doesn't also work with Microsoft's Entourage mail program).

Admittedly, there's nothing particularly eye-catching in Bento 2.0, but its new features make it a worthwhile upgrade for existing users. And, at just £29, it's good value for Mac users who don't need the professional-level features of Filemaker Pro. *Cliff Joseph*

Verdict

Pros Improved file import and export; easier customisation of form layouts and tabular data
Cons Poor documentation; lacks the scripting and relational database capabilities of Filemaker Pro
Overall A good upgrade that enhances the program's ease of use and productivity

Features	★★★☆☆
Ease of use	★★★★☆
Value for money	★★★★★
Overall	★★★★☆

Price £29 single user; £59 five-user licence
Contact Filemaker +353 613 66570 www.filemaker.co.uk
System requirements Mac with 1GHz processor • Mac OS X v.10.5.4

OCR SOFTWARE

Abbyy Fotoreader

A handy tool for extracting text from photos and other images

Abbyy's Finereader is one of the best-known OCR tools for converting scanned documents into editable ones. This new product uses the same technology to capture text from photos.

Fotoreader integrates with Word and Excel, and can create PDF files containing both converted text and images taken from the source photo. The process of converting a photo is simple: choose how you want to export it (Word, Excel, PDF or Rich Text), pick an image, and after a few seconds the document will appear. If the results aren't good enough you can switch to the Fotoreader window to make changes.

The Fotoreader window overlays the parts of the photo it thinks contain useful content, marking them green for text, red for images and blue for tables of information. The software does a good job of calculating which types are appropriate, but a few seconds spent tweaking these usually yields better results.

We found the software impressively accurate. A half-page *PCW* review was converted correctly, albeit with a few unnecessary italicisations. After correcting the software, which had mistaken the product screenshot for a table, it exported a usable copy of the review as a PDF file. A feature table taken from a *PCW* lab test was converted reasonably into Excel, although two rows were merged into one and a few ticks became letters. Half a page of small white text on a red background was converted with just two minor errors, but when converting photos of business cards the @ signs in email addresses often turned into zeros.

A second tool, Screenshot Reader, allows you to select an area of the screen and convert it to text. This isn't a product for everyone, and for converting business cards only we'd recommend a dedicated scanner, but it does its job at a reasonable price. *Tom Royal*

Verdict

Pros Accurate and simple to use
Cons Not ideal for business card scanning
Overall Works well and integrates neatly with Office, but for converting cards stick to a dedicated scanner

Features	★★★★☆
Ease of use	★★★★★
Value for money	★★★★☆
Overall	★★★★☆

Price £36
Contact Abbyy www.abbyy.com
System requirements Windows 2000, XP or Vista • 1GHz processor • 512MB Ram • 1GB free hard disk • Five-megapixel camera • Supports BMP, DCX, JPEG, PCX, PNG and TIFF images

FIRST-PERSON SHOOTER

Left 4 Dead

A stylish, challenging and rewarding battle for survival against lots and lots of zombies

Stylish presentation and an original zombie design with movie-like qualities make this game highly engrossing

Left 4 Dead is, initially, a stab at the co-operative team-play versus computer-controlled opposition first-person shooter – a concept that hasn't had much success on the PC. You can play alone with the rest of your team controlled by artificial intelligence (AI), but we found the AI rather dim, falling off ledges and refusing to take the lead.

Instead, it's best to go online and find three other human players to band together as the four survivors featured in Left 4 Dead. With basic weaponry, grenades and health kits you battle through hundreds of aggressive zombies over four levels, each of which takes around 50 minutes to complete.

It's a simple concept, but the stylish presentation and original zombie design make it immediately engrossing. Zombies include Boomers who throw up on you, causing hordes of regular zombies to come rushing at you; Smokers, who suck you in with a long tongue; Hunters, who jump on you; Tanks, who are muscular monsters; and Witches, who just sit crying unless you disturb them.

Good tactics, such as conserving ammunition and using pipe bombs at the right moment, and genuine team-play, where you each take an angle to fire at and you distribute health packs selflessly, are essential to success. Veteran gamers who don't help teammates will quickly end up dead, and in most situations you'll need at least three survivors working together because each zombie has the ability to incapacitate you, and only the teammates can revive you.

The camaraderie built up by helping and deciding a course of action with three other gamers online for 50 minutes at a time is epic. The experience is helped by Left 4 Dead's stylish presentation, which includes the level-loading movie poster with everyone's gamer-name featured above their character.

The game is based on the four-year-old Half-Life 2 source engine, so graphics aren't as good as you'll get out of other new titles. But we forgive that because character animations are excellent and older hardware can play the game at high resolutions. That said, a few improvements have been added to the original source engine, including a film grain setting which makes you feel like you're playing through a 1970s horror film.

Once you've finished the co-operative versus AI levels, it's worth moving into the versus mode, where four players take control of the zombies and another four stick with the survivors. Although there are only two levels in this mode, it is terrific fun, with teams alternating between the zombies and survivors every 10 minutes or so until you've completed the level.

Our only complaint with Left 4 Dead is the lack of decent servers. Connecting to an online co-op or versus server is a pain since the interface is designed for the Xbox 360 and there's little control over which server you end up playing on. That means you can end up playing on servers not based in the same country as you, resulting in unplayable amounts of lag.

Valve doesn't appear to have set up enough dedicated servers anywhere, since sometimes we couldn't connect to one for several minutes – and in one case an entire evening – an experience we confirmed on forums and with other gamers. We also experienced several disconnects, which means you have to start over.

Despite Valve's volatile servers, Left 4 Dead is challenging, rewarding and hugely engrossing, and we recommend it to anyone willing to give online gaming a try. *Emil Larsen*

Verdict

Overall An engrossing and stylish zombie game that feels like a movie and sets a new, higher standard for co-operative first-person shooters

Overall ★★★★★

Price £29.99

Contact Valve
www.steampowered.com

System requirements Pentium 4 3GHz • 1GB • 128MB graphics card • ATI 9600 or Nvidia 6600 or better • 7.5GB hard drive space

Personal Computer World

How we test

Performance testing is an important part of *PCW*'s reviewing process, and to obtain our authoritative results we use the UK's best PC testing resource. Here we explain why you can trust our results and give you a tour of our most frequently used benchmark programs

At the core of our PC performance tests are industry-standard benchmarks from Bapco and Futuremark. Sysmark 2007 Preview is the latest Vista-compatible version in a long line of Bapco benchmarks and it allows us, for the first time, to compare the application performance of Windows XP and Windows Vista-based systems with the same benchmark. It tests real-world application performance by running a series of scripts to mimic authentic user tasks. It loads and runs full versions of 14 market-leading applications, which are:

- Adobe After Effects 7
- Adobe Illustrator CS2
- Sketchup 5
- Adobe Photoshop CS2
- Autodesk 3ds Max 8
- Sony Vegas 7
- Macromedia Flash 8
- Microsoft Excel 2003
- Winzip 10
- Microsoft Outlook 2003
- Microsoft Powerpoint 2003
- Microsoft Word 2003
- Microsoft Project 2003
- Microsoft Windows Media Encoder 9 series

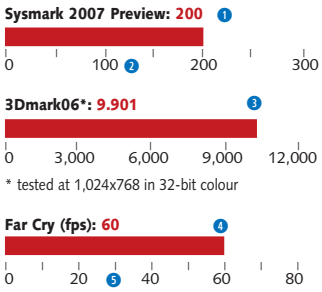
Note that scores from Sysmark 2007 Preview are not comparable to scores from previous versions of Sysmark. All scores are relative to the Sysmark reference machine, which scores 100 (see below for details).

In *PCW's* labs, our staff have over 20 years of combined testing experience. We know all the perils and pitfalls of practical benchmarking, and we contribute to the development of industry-standard benchmarks through our full membership of Bapco (**www.bapco.com**), the non-profit benchmark consortium. Listed below are the main benchmarks we use for testing PC systems and components.

- Bapco Sysmark 2007 Preview – an application-based benchmark that tests real-world system performance.
- Futuremark 3Dmark06 – the latest version of 3Dmark that tests DirectX 3D graphics performance.
- Games – we use built-in benchmarks in Far Cry and Fear to see how graphics cards perform in a real-world games.
- Futuremark PCmark05 – a synthetic benchmark used to test the performance of a PC's major subsystems.
- Test beds – we use standardised AMD and Intel-based test rigs to test components and peripherals.

There's more information about our testing procedures and benchmarks on our Labs site at **www.reportlabs.com/testbed/bguides/benchmarks.php**.

Performance



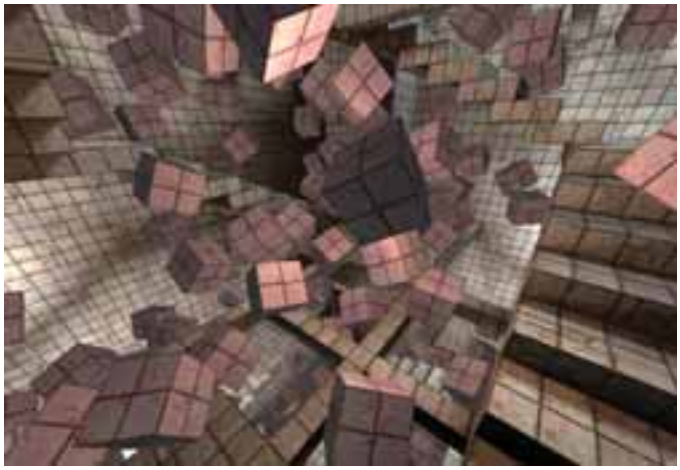
1 A score of 200 indicates that the system is twice as fast as the reference PC.

2 The reference PC (Intel Core 2 Duo E6300 1.8GHz, 1GB Ram) scores 100.

3 An Nvidia Geforce 8600GT would score in the region of 9,900.

4 Fear: A score of 60fps (frames per second) or higher is most desirable.

5 A result of 30fps or above means the machine can produce playable frame rates at the tested resolution.



PCmark05 measures memory, processor, graphics and hard drive performance

3Dmark06 is used to test 3D graphics performance

Sysmark 2007 Preview tests real-world performance using common apps

Best Buys

Your one-stop guide to the best-value products reviewed by PCW

With countless products available, shopping around for a new PC, peripheral or software package isn't an easy task, but with our Best Buys guide, you can make a quick purchase with confidence. We've split our Best Buys into 40 of the most popular categories, covering everything from desktop and notebook PCs right through to digital cameras and software.

Every month we'll update our Best Buys to include our most recent reviews and check the current pricing, although that's not to say you won't find a bargain online (try our price comparison site at **www.pcw.co.uk/bestprices**). You'll also find the date of the magazine in which the product was first reviewed, along with an alternative suggested product for that category. If the Best Buy entry has a web code listed alongside it, this means you can read the full product review on our website. Simply head online and use the format **www.pcw.co.uk/[web code]** – for example, **www.pcw.co.uk/2208243**.

Each Best Buy product has gone through our rigorous testing and reviewing procedures, making this your one-stop guide to the best products on the market.

BUDGET PC

Zoostorm 3364-2354
Price: £499
Reviewed: July 2008
www.pcnextday.co.uk
Web code: N/A
This PC comes with a quad-core Intel Q6600 processor, 2GB of Ram, a 250GB hard disk and a 19in TFT. The only downside is the integrated graphics, but with expansion opportunities inside the case, this can be rectified.

ALTERNATIVE

Chillblast Fusion Sentinel
£699 www.chillblast.com Web code: 2211955
A well-built, quiet PC with a quad-core processor, good all-round performance and space inside for future upgrades. It also features a Geforce 8800GT graphics card.

HIGH-END PC

PC Specialist Fusion 4870X2
Price: £1,499
Reviewed: December 2008
www.pcspecialist.co.uk
Web code: N/A
A rare AMD-based system, this PC is perfect for high-end gaming and video editing. It features a dual-core 4870X2 graphics card, X4 9950 quad-core CPU and 8GB of Ram. You also get a decent 24in TFT.

ALTERNATIVE

Ultraviolet Genesis XOC
£4,464.93 www.ultravioletmachines.com Web code: N/A
The price may make your eyes water, but they don't get much faster than this, with an overclocked QX6850 and two 8800 graphics cards.

BUDGET NOTEBOOK

Samsung Q210
Price: £675.98
Reviewed: November 2008
www.samsung.com/uk
Web code: N/A
It's not suited to gaming, but this notebook has all the benefits of Intel's latest Centrino 2 platform. Powered by a T8400 Core 2 Duo processor clocked at 2.26GHz, it's a stylish workhorse computer.

ALTERNATIVE

Hi-Grade D7000SRL
£499 www.hi-grade.com Web code: N/A
With a stylish chassis, decent performance, Bluetooth and HDMI, you get a lot for your money with this 15.4in notebook.

HIGH-END NOTEBOOK

HP Pavilion dv7-1000ea
Price: £899
Reviewed: December 2008
www.hp.com/uk
Web code: N/A
Based on Intel's Centrino 2 platform, this notebook combines stylish design with high-end performance. It also has a Blu-ray reader and a crystal-clear 17in display. It's heavy, but as a desktop replacement it's perfect.

ALTERNATIVE

Acer Aspire 8920G
£1,289.99 www.acer.com Web code: N/A
Thanks to a recent price drop, this 18.4in notebook is now even better value for money. Highlights include a 2.5GHz processor and Blu-ray drive.

WINDOWS HOME SERVER

Fujitsu Siemens Scaleo 1900
Price: £469
Reviewed: July 2008
www.fujitsu-siemens.co.uk
Web code: N/A
It might not be the most attractive piece of computer kit, but this Windows Home Server from Fujitsu Siemens has good read-and-write performance and comes with some useful added extras.

ALTERNATIVE

Belinea O.center
£386.58 www.belinea.com Web code: N/A
With a striking design and solid performance, the O.center is a great little Windows Home Server with easy hard-disk access and good diagnostic tools.

ULTRA-MOBILE PC

MSI Wind
Price: £336.05
Reviewed: Christmas 2008
www.msicomputer.com
Web code: N/A
This netbook offers good battery life and a larger screen than many other models. With 1GB of memory and a 160GB hard drive, the MSI Wind is well specced all round and represents great value.

ALTERNATIVE

Acer Aspire One
£200 www.acer.co.uk Web code: 2220487
This portable notebook combines a decent keyboard, clever storage system and a great design. Its Intel Atom processor runs at 1.6GHz, backed up by 512MB of Ram.

BUDGET GRAPHICS CARD

Palit Geforce 9600GT 512MB Sonic
Price: £121.32
Reviewed: June 2008
www.palit.biz
Web code: N/A
The G94 GPU used by this card is basically a cut-down version of the G92 8800 and GTS cards, but with fewer, yet faster-clocked, stream processors.

ALTERNATIVE

Asus EAH2400Pro
£32.89 http://uk.asus.com Web code: N/A
This card features low power consumption and, although not as fast as the Radeon HD 2400 Pro cards, it's cheap and has some impressive video capabilities.

HIGH-END GRAPHICS CARD

Sapphire Radeon HD4870
Price: £181.76
Reviewed: October 2008
www.sapphiretech.com
Web code: 22233563
A fast card at a great price. To give an idea of the rendering potential of this card, it managed 46 frames per second with 4x anti-aliasing and 4x antroscopic filtering turned on at 1,280x1,024 resolution.

ALTERNATIVE

Zotac Geforce GTX 280 AMP Edition
£366.27 www.zotac.com Web code: 2223078
Zotac's version of the GTX 280 is the fastest single-core graphics card we've tested. The board also supports Nvidia's Hybrid Power technology.

TFT (17-22IN)

Philips 220WS8
Price: £189
Reviewed: February 2008
www.philips.co.uk
Web code: N/A
This 22in TFT screen has superb image quality, is evenly lit and with a power draw of just 35W is also extremely efficient. The icing on the cake is Philips' excellent pixel policy. A great buy.

ALTERNATIVE

Viewsonic VX2255
£259 www.viewsoniceurope.com Web code: N/A
The VX2255's clear and excellent pixel policy, along with its multimedia features, make it great value at £259, despite the distinctly average image quality.

TFT (24IN+)

Philips 240BW8
Price: £309.95
Reviewed: September 2008
www.consumer.philips.com
Web code: N/A
This 24in screen has a professional feel and is well suited to any application where you need to be sure that your on-screen colours are accurate. It also comes at a good price and features HDCP support.

ALTERNATIVE

Iiyama B2403WS
£299.60 www.iiyama.co.uk Web code: N/A
The 24in B2403WS from Iiyama offers a good balance of performance and features, and is suitable for a wide range of uses.

SMARTPHONE

Apple iPhone 3G
£ from free
Reviewed: December 2008
www.apple.com/uk
Web code: N/A
It might not have as many features as some of its rivals, but the iPhone benefits from outstanding ease of use, a superbly stylish design, 3G (new to this version) and an online applications store.

ALTERNATIVE

RIM Blackberry Bold
£ from free http://eu.blackberry.com Web code: N/A
Once the sole domain of business users, the Blackberry now features a similar level of consumer features as high-street phones.

SAT NAV

Tomtom Go 720
Price: £309
Reviewed: February 2008
www.tomtom.com
Web code: N/A
You're paying a bit more than you might for a number of perfectly capable rivals, but you get so much for your money with the Tomtom Go 720, including a customisable display and great performance on the road.

ALTERNATIVE

Mio 620t
£269 www.mio-tech.be Web code: N/A
Mio's new software is impressive and, considering the range of features, it's priced competitively. The maps look great and performance is equally good.

DIGITAL CAMCORDER

Canon HV30
Price: £700
Reviewed: November 2008
www.canon.co.uk
Web code: N/A
With fantastic picture quality, this camcorder is the one to buy if you're looking to make the most out of your HD television. It also has a great selection of manual controls and lets you edit your footage.

ALTERNATIVE

Panasonic HDC-SD9EB
£450 www.panasonic.co.uk Web code: N/A
Able to capture decent HD footage yet remaining light, portable and cheap, this Panasonic camcorder is a great buy for those on a budget.

DIGITAL CAMERA

Samsung NV24HD
Price: £249
Reviewed: October 2008
www.samsungcamera.com
Web code: N/A
With excellent build quality, a 10.2-megapixel CCD and wide-angle 24mm lens, this digital camera is perfect for taking detailed outdoor shots. It also features 720p movie recording, so you can capture video in high definition.

ALTERNATIVE

Pentax Optio A40
£219 www.pentax.co.uk Web code: N/A
This 12-megapixel compact camera houses some great features, not least of which is the excellent image stabiliser. It also shoots great photos.

PORTABLE MEDIA PLAYER

Apple iPod Nano
Price: £109
Reviewed: December 2008
www.apple.com/uk
Web code: N/A
Stylish and thinner than ever before, the new iPod Nano features motion sensors, allowing it to detect whether you're holding it in portrait or landscape mode, and a quick shake activates the shuffle mode.

ALTERNATIVE

Sony NWZ-A815
£89 www.sony.co.uk Web code: 2203060
It might lack some of the extra features found on rival players, but this Sony model excels in terms of audio quality and is easy to navigate.

MEDIA STREAMER

D-Link DSM-330
Price: £135
Reviewed: October 2008
www.dlink.co.uk
Web code: N/A
With its excellent usability and simple setup procedure, this device makes sharing your media collection simple. It features an HDMI port, can output 720p video and performs extremely well.

ALTERNATIVE

Archos TV+
£249 www.archos.co.uk Web code: 2210545
With a 250GB hard disk, this device not only streams media across a network, but can also store your entire video, music and photo collection locally.

LASER PRINTER

Brother HL-2170W
Price: £149
Reviewed: March 2008
www.brother.co.uk
Web code: 2207225
If you're looking for a good-quality monochrome laser printer for general home use, this Brother model is definitely worth considering. It's fast, compact and even has a wireless adapter. A bargain at this price.

ALTERNATIVE

Lexmark X500n
£301 www.lexmark.co.uk Web code: N/A
An amazingly good-value laser printer, considering it's not only colour but also includes a scanner, allowing you to scan, copy and print at speed.

PHOTO PRINTER

Canon Selphy CP750
Price: £110
Reviewed: October 2007
www.canon.co.uk
Web code: 2193769
It's a little bulky when in use, but this dedicated photo printer can produce high-quality prints in under 70 seconds. And a 2.4in display allows you to perform basic image editing before printing.

ALTERNATIVE

Sony DPP-FP90
£150 www.sony.co.uk Web code: 2196751
It's not particularly cheap to run, but this printer produces high-quality photos from a variety of sources and is reasonably fast as well.

MULTIFUNCTION PRINTER

Canon Pixma MP610
Price: £139
Reviewed: November 2008
www.canon.co.uk
Web code: N/A
Canon's compact and stylish MFD has a decent mix of top-notch quality and fast printing and can also print directly to DVDs. Running costs are relatively low, which is surprising given the low price tag.

ALTERNATIVE

HP Photosmart C8180
£298.45 www.hp.com/uk Web code: N/A
An expensive, but hugely impressive MFD, the Photosmart C8180 is packed full of useful features and is also incredibly easy to use.

NETWORK-ATTACHED STORAGE

Qnap TS-209
Price: £254
Reviewed: Christmas 2007
www.qnap.com
Web code: 2200223
If you're after a Nas device that does more than just share files over your network, this is it. You can schedule Bittorrent downloads, stream media to UPnP devices and install your own drives in it.

ALTERNATIVE

Acer Aspire Easystore
£499 www.acer.co.uk Web code: 2206105
This Nas device features 2TB of storage (other sizes are available), along with wireless, so you can place it anywhere in your home.

POWERLINE NETWORKING

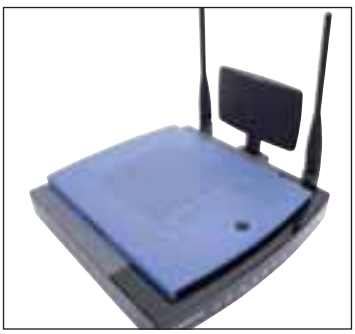
Solwise NET-PL-200AV Push
Price: £50
Reviewed: March 2008
www.solwise.co.uk
Web code: 2207035
You'll need at least two of these to get your powerline network running, but they're the best around. Based on the Homeplug AV standard, they're fast, resilient to electrical noise and great value for money.

ALTERNATIVE

Devolo Dlan 200 AV
£149 www.devolo.co.uk Web code: N/A
Small and well designed, these Devolo powerline devices use the Homeplug AV standard and have pre-programmed quality of service rules built in.

WIRELESS ROUTER

Linksys WAG325N
Price: £99.99
Reviewed: May 2008
www.linksys.com
Web code: N/A
It might look a little unconventional, but this Draft-N router from Linksys performs extremely well. It also features some sophisticated tools, has VPN support and allows the creation of virtual wireless networks.



ALTERNATIVE

Solwise Engenius Wireless-N Gigabit Router
£120 www.solwise.co.uk Web code: N/A
It might be a little pricey, but this router performed well in our tests and comes complete with some advanced network filtering tools.

EXTERNAL HARD DISK

CMS V2ABS-CE-120
Price: £175
Reviewed: Christmas 2007
www.cmsproducts.com
Web code: 2202396
A portable USB2 external hard disk that weighs a mere 150g and comes with built-in 256-bit AES encryption. Inside the case sits a 2.5in 120GB 5,400rpm Sata notebook hard disk.

ALTERNATIVE

Western Digital Mybook Studio
£204 www.westerndigital.com Web code: 2206075
This stylish 1TB external disk comes with USB2, Firewire 800/400 and eSata interfaces for ultimate flexibility.

INTERNAL HARD DISK

Western Digital WD10EACS
Price: £185
Reviewed: January 2008
www.westerndigital.com
Web code: 2203061
This disk features four 250GB platters to provide 1TB of storage. It includes some advanced technology such as Intelliseek, which calculates optimum seek speeds to lower noise, vibration and power usage.

ALTERNATIVE

Toshiba MK2035GSS
£79 www.toshiba.co.uk Web code: 2203064
Weighing just 98g, this 200GB 2.5in Sata hard disk is perfect for increasing the storage capacity of your notebook.

AMD MOTHERBOARD

Gigabyte GA-MA78GM-S2H
Price: £60
Reviewed: June 2008
www.giga-byte.co.uk
Web code: N/A
With a wide range of ports, including eSata, and a good selection of options in the Bios, this is a great AMD board. Finally, after two years of losing to Intel, AMD's engineers have a winner on their hands.

ALTERNATIVE

EQS AB1S-RS690MKM
£46 www.eqscomputers.com Web code: 2204803
The cramped design limits upgrade potential, but it's a keenly priced AMD motherboard that features an on-board HDMI port for HD video.

INTEL MOTHERBOARD

Asus P5E-VM HDMI
Price: £81
Reviewed: June 2008
http://uk.asus.com
Web code: N/A
This board has a great range of features. With the integrated graphics enabled, we comfortably overclocked it to 3GHz with our 2.4GHz Core 2 Quad Q6600 attached, so enthusiasts should take note of its capabilities.

ALTERNATIVE

Gigabyte GA-G31MX-S2
£53 www.giga-byte.com Web code: 2202711
Considering the price, you get plenty of features on this Intel board, including Intel's G31 Express chipset and ICH7 Southbridge.

PC CASE

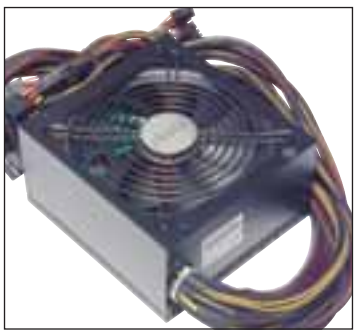
Hiper Osiris
£79.90
Reviewed: November 2008
www.hipergroup.com
Web code: N/A
Despite its low price, this case features terrific build quality. And with easy-to-use latches, swapping out components is a cinch. It comes with four 3.5in and five 5.25in bays, and also looks great.

ALTERNATIVE

Akasa Omega
£139.81 www.akasa.co.uk Web code: N/A
Excellent build quality and some interesting design features make this a great case for those who are often changing components.

POWER SUPPLY

Akasa Powermax 1000
Price: £135.11
Reviewed: March 2008
www.akasa.co.uk
Web code: 2207736
This 1,000W power supply has two +12V rails and its single 135mm dual-ball-bearing fan makes it a lot quieter than you would expect. It also comes with a variety of power connectors.



ALTERNATIVE

Enermax Galaxy 1000W
£233.83 www.enermax.com.tw Web code: 2164011
The 1,000W Enermax Galaxy power supply will suit those with SLI graphics and other power-sapping components, but it comes at a fairly high price.

OFFICE SUITE

Microsoft Office 2007
Price: £357
Reviewed: May 2007
www.microsoft.com
Web code: 2183475
The new interface to Office is something you'll either like or loathe. We like it, but upgrading comes at a price, both in cash and in effort. Despite this, it's still the leader in office productivity software.

ALTERNATIVE

Corel Wordperfect X3
£276 www.corel.co.uk Web code: 2149856
This latest version of Corel's office suite includes tools such as PDF exporting, along with improved compatibility with other office applications.

SYSTEM UTILITY

Acronis True Image 11
Price: £39.99
Reviewed: April 2008
www.acronis.co.uk
Web code: 2208669
True Image 11 is an excellent backup and recovery solution that offers an unprecedented level of control over disk cloning, scheduled backups and secure file deletion. And, despite the range of features, it's easy to use.

ALTERNATIVE

Paragon Hard Disk Manager
£29.99 www.paragon-software.com Web code: 2205339
A comprehensive, all-in-one suite of hard-disk maintenance and backup tools that's easy to get to grips with and comes at a good price.

IMAGE EDITING

Adobe Photoshop Elements 7
Price: £76.38
Reviewed: December 2008
www.adobe.co.uk
Web code: N/A
Some of its advanced tools and special effects might not be required by most amateur photographers, but Adobe Photoshop Elements remains the standard that rival image editors must compete against.

ALTERNATIVE

Corel Paint Shop Pro X2
£79 www.corel.com Web code: N/A
A little more expensive than its main rival, Photoshop Elements, but Paint Shop Pro X2 excels in terms of ease of use.

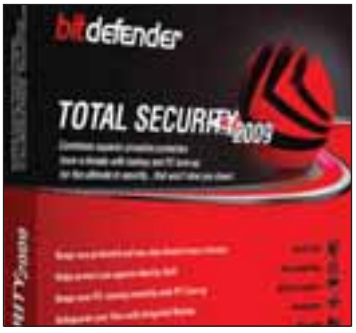
VIDEO EDITING

Pinnacle Studio 12 Ultimate
Price: £90
Reviewed: October 2008
www.pinnaclesys.com
Web code: N/A
Pinnacle has stuck with its usual intuitive interface and added a host of extra features, including new special effects and the ability to import full HD video from AVCHD sources. It can also export direct to Blu-ray.

ALTERNATIVE

Adobe Premiere Elements 7
£76.38 www.adobe.co.uk Web code: N/A
Suited to beginners as well as more experienced users who know how to make the most of its powerful special effects and editing tools.

PC SECURITY



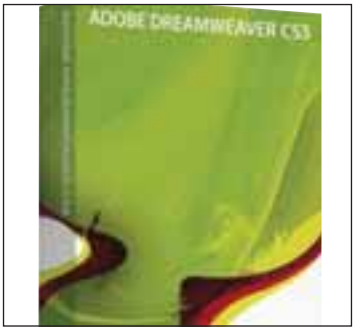
Bitdefender Total Security 2009
Price: £44.95
Reviewed: January 2009
www.bitdefender.com
Web code: N/A
A comprehensive suite that's easy to use, and has fast scan times and low system overheads. With extra tools including backup and parental controls, this is a good all-rounder.

ALTERNATIVE

Kaspersky Internet Security 2009
£39.99 www.kaspersky.com Web code: N/A
An excellent security suite with top-class anti-virus protection and one-click problem solving.

WEB DESIGN

Adobe Dreamweaver CS3
Price: £393
Reviewed: July 2007
www.adobe.com
Web code: 2186591
Powerful HTML coding and design tools along with CSS templates and Ajax widgets will help non-programmers get started. There's also a big emphasis on CSS, including a CSS Advisor tool for newcomers.



ALTERNATIVE

Microsoft Expression Web
£260 www.microsoft.com Web code: 2185242
Expression Web is a very good web-editing suite if you accept the inevitable Microsoft bias, and features CSS support and a powerful interface.

BUSINESS PC

Dell Latitude D531
Price: £586
Reviewed: October 2007
www.dell.com
Web code: N/A
With a dual-core AMD Turion processor clocked at 1.8GHz, 2GB of Ram and Vista Business, this is a good budget model. It also features a built-in DVD writer, 120GB Sata hard disk and both Wifi and Bluetooth.

ALTERNATIVE

HP Compaq dc7800
£598 www.hp.co.uk Web code: 2207533
The space-saving design of this affordable business desktop is very compelling and it can attach directly to an optional HP TFT screen.

BUSINESS PRINTER

HP Laserjet P1505n
Price: £205.63
Reviewed: June 2008
www.hp.com
Web code: N/A
Compact, stylish and quicker than it looks, this Laserjet from HP is a very capable small-business printer and is stunningly good value to boot. It also features an integrated network interface.

ALTERNATIVE

Zebra P100i
£1,245.50 www.zebracard.com Web code: 2212221
A great device for small businesses needing to print plastic cards in volume. It takes up little desk space and can print in full colour.

NETWORK SECURITY

Smoothwall Smoothguard 1000-UTM
Price: £3,231.25
Reviewed: September 2007
www.smoothwall.net
Web code: 2194393
A comprehensive array of security tools, load balancing and failover facilities, plus extensive reporting options, mean this network security device justifies the high price.

ALTERNATIVE

Webroot Antispyware Corporate
£22.56 www.webroot.com Web code: N/A
This is the per-seat price for a one-year licence, which is great value. It also covers two key client security bases in one go.

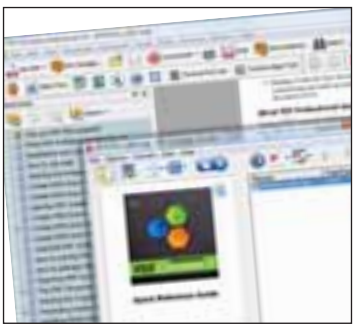
NETWORK MANAGEMENT

VMWare Thinapp 4.0
Price: £2,937.50
Reviewed: November 2008
www.vmware.com
Web code: N/A
Although its cost may be an issue for small businesses, Thinapp overcomes many of the issues associated with deploying and managing applications. It features on-demand streaming, USB key deployment and more.

ALTERNATIVE

Prefix IT PrefixNE
Up to £2.94 per PC per month www.prefixit.com Web code: 2205651
Easy to install and use, this network management application allows you to keep track of all the kit on your network and is perfect for small businesses.

COLLABORATION SOFTWARE



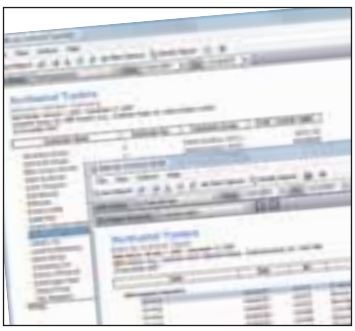
Nuance PDF Converter Professional 5
Price: £99
Reviewed: June 2008
www.nuance.co.uk
Web code: N/A
It may often take second billing to Adobe Acrobat, but this latest release is cheaper and just as good – if not better. The only problem is there are so many new tools to learn.

ALTERNATIVE

C2C Archive One Policy Manager
£40 www.c2c.com Web code: 2212370
This is a well-conceived and easy-to-implement exchange storage management tool that can enhance performance and even reduce costs.

BUSINESS ACCOUNTS SOFTWARE

Microsoft Accounting 2008
Price: £149
Reviewed: February 2008
www.samsung.co.uk
Web code: 2207529
A late entrant to the UK accounting market, Office Accounting 2008 is easy to use, feature-rich and will shake up the competition. It also offers in-depth integration with Outlook 2007 Business Contact Manager.



ALTERNATIVE

Intuit Quickbooks Pro 2008
£299 www.quickbooks.co.uk Web code: 2203178
A sensible update to what is one of the most accessible and easy-to-master small-business accounting packages around. Syncs with Outlook.

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PALICOMP.CO.UK

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ON TEST

80 Acer Predator G7700 Crusher
81 Chillblast Fusion Scorpion
82 Cyberpower Liquid Gamer Infinity Hydra
83 PC Specialist Vortex
86 Wired2Fire Diablo Extreme

87 Table of features
88 Performance results
89 What makes Core i7 special
Editor's Choice

'The launch of the new technology seemed to be the perfect time to look at some ultimate high-end boxes'

Core values

Intel's latest processor architecture hit the streets in November 2008. Simon Crisp rounds up a selection of 'Ultimate PCs' to see how well Core i7 actually performs

With the introduction of Intel's latest processor technology, the Core i7 desktop series, along with its X58 chipset companion, has some of the most powerful computing seen to date. The new CPUs see the return of Hyperthreading, a technology that doubles the number of logical cores visible to operating systems and software from four to eight. With the introduction of triple-band memory support in the X58 there is some serious bandwidth to play with – we now need software and games developers to catch up.

The launch of the new technology seemed to be the perfect time to look at some ultimate high-end boxes. How are system builders using the new CPUs and chipsets, and how do they perform against the serious systems built around the previous generation's technology?

The last time we looked at Ultimate PCs, all the desktop systems used Windows XP; this time around, with the exception of Acer's Predator (32-bit Vista Home Premium), they all use 64-bit versions of Windows Vista Home Premium. This means they can take advantage of all the memory bandwidth available beyond the 3GB limit of XP and the 32-bit version of Vista.

Read on to see some of the best systems money can buy.

Acer Predator G7700 Crusher

Price £2,543 **Contact** Acer 0870 853 1005 www.acer.co.uk

The Predator has lots going for it, despite its looks

If you want your PC to stand out from the crowd on looks alone, then there is only one PC in this group test for you, Acer's Predator G7700 Crusher. It certainly is a talking point: some say only a mother could love its appearance but others hate its *Transformers*-style casing. The bright orange finish is certainly eye-catching.

The Predator is one of two systems in this group test not to use Intel's new Core i7 technology, but expect to see a model based around the new architecture before too long. Powering the beast is an Intel Core 2 Extreme Q9450 processor; a quad-core CPU running at its stock speed of 3GHz. Backing this up is Nvidia's Nforce 780i SLI chipset and 4GB of 800MHz DDR2 memory.

This system is surprisingly quiet, thanks mainly to the sealed water cooling system and chunky side panels Acer has employed.

On the graphics side of things the Predator is the only computer in this test to use Nvidia graphics cards, in this case a pair of Geforce 9800GTXs, each with 512MB of GDDR3 memory set up in an SLI configuration. These still give playable frame rates at high resolutions, even if they are not quite up to the limits of all the other systems using dual HD4870 X2s.

The front panel lifts up to reveal an 18-in-1 Flash card reader and at the bottom of the front bezel, hidden behind a door, are the four 3.5in drive bays. In our review unit these held a single fast Western Digital 150GB Raptor drive for the 32-bit Vista Home Premium OS and two Western Digital Caviar Blue 640GB disks for extra storage, leaving one bay free for expansion.

The drive bays are reminiscent of those used in servers. As they don't need tools to open them, all you have to do to get access to a drive is to pull down the locking lever and then you can pull out the drive cradle and drive all in one go.

Two optical drives are fitted, a four-speed Lite-On Blu-ray Rom and a Hitachi multiformat DVD burner. There's a panel on the top of the system that holds four USB ports alongside microphone and headphone jacks. The panel is quite annoying as you constantly want to push it back down into the case, but it's fixed in place. The rear I/O panel holds another four USB ports as well as two eSata ports, a Firewire port, seven audio ports including an optical S/PDIF port, and a tiny Cmos button which is very useful should you want to tinker about with the Bios settings.

If you make a mistake or alter a setting too far, then pushing this button will clear the BIOS back. It's much easier than opening the system up and fumbling about on the motherboard looking for the Cmos jumper.

Verdict

Pros Defiantly something different to the usual black boxes

Cons Needs refreshing to new technology

Overall Still a quick system and ideal for people who want something a little different. Hopefully Acer will soon update it to Core i7

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Chillblast Fusion Scorpion

Price £2,874 **Contact** Chillblast 0845 456 7830 www.coolermaster.com

The Fusion is cooled by a huge third-party Noctua cooler

A round-up of fast overclocked systems wouldn't be complete without a Chillblast system, and overclocking is one of the things the company does very well. It's a measure of their performance – and just how far you can push the Core i7 processors – when you consider that the systems use CPUs that run some 600MHz over stock speed, just through air cooling.

At the heart of the Scorpion is a i7 940 which is normally clocked at 2.93GHz, but Chillblast has it running in the Fusion at 3.58GHz, cooled by a huge third-party Noctua cooler. Noctua may be a new name to many people but the company is gaining a reputation for making some of the best coolers around.

The CPU sits in a brand new Asus motherboard – one we haven't seen before, the Rampage II Extreme. Part of Chillblast's Republic of Gamers range, the Rampage II Extreme has a wealth of overclocking features including something Asus calls Tweakit, a panel on the motherboard that allows overclocking outside of the Bios and Bios tweaking in the operating system. Backing up the CPU is 6GB of Corsair DDR3 memory comprising three 2GB modules of 1,333MHz Dominator high-performance memory.

Powering the graphics side of things is a pair of ATI HD4870 X2 cards arranged in a Crossfire configuration, each with a pair of graphic cores running at 750MHz while the GDDR5 memory is clocked at 900MHz. However, because it's GDDR5 it effectively runs at 3.6GHz. Audio is provided by a Creative X-Fi soundcard.

Chillblast hasn't held back when it comes to disk drives either. For the installation of the Windows Vista Home Premium 64-bit operating system and other applications there are not one but two OCZ Core Series SSDs (solid-state disks) arranged in a Raid 0 array, meaning the operating system sees it as one single, extremely fast 60GB disk. There is one more drive, a Seagate ST3150034AS 7,200rpm unit that offers a huge 1.5TB of free space for all your other files and applications. A single optical disk, in the shape of an LG GGC-H20L Super Multi six-speed Blu-ray/three-speed HD DVD combo burner, is provided for backing up data or watching movies.

The Fusion is one of only two systems that doesn't use a Coolermaster case (the Acer Predator is the other) but instead uses an Antec Twelve Hundred, one of Antec's line of gaming cases.

Although you can't add any more expansion cards to the motherboard – slots are free but are hidden by the graphics cards – you have plenty of scope for extra drives – there are two 3.5in and five 5.25in drive bays.

Powering all the hardware sitting in the base of the case is one of Coolermaster's new Real Power Pro 1250 power supplies, which has an output of 1,250W.

Verdict

Pros Superb performance. Use of solid-state disks

Cons Case styling may not appeal to everyone

Overall Chillblast shows just how capable the new Core i7 technology and supporting chipset is – a superb and stable overclocked system

Features	★★★★☆
Performance	★★★★★
Value for money	★★★★☆
Overall	★★★★½

Cyberpower Liquid Gamer Infinity

Price £3,499 **Contact** Cyberpower 0191 497 8340 www.cyberpowersystem.co.uk

The Hydra offers a great lightshow from coolant dye and coloured LEDs

The second system in this group not to use the new i7 technology, Cyberpower's Liquid Gamer Infinity Hydra, instead uses a previous generation Core 2 Quad processor. Both it and the graphics cards are cooled by one of the neatest water cooling installations we have seen for a very long time.

Sitting under the compact CPU water block is an Intel Core 2 Quad Q9650, the fastest non-Extreme quad-core processor of the previous generation's 45mn processor. As standard, the Q9650 has a clock speed of 3GHz, a 1,333MHz front-side bus and each core has 3MB of L2 cache. But water cooling has allowed Cyberpower to increase the core speed to an impressive 3.9GHz, and a stable 3.9GHz at that.

The CPU sits in a Foxconn Black Ops motherboard that uses an Intel X48/ICH9R chipset combination, with the four Dimm slots filled by 2GB modules of Corsair super-fast PC3 1,600MHz memory for a total of 8GB of memory.

The second cooling system cools a pair of ATI Radeon HD4870 X2 graphics cards and, because they don't have the huge cooling shroud of the original HD4870 X2, Cyberpower has been able to squeeze a Creative X-Fi Xtreme Gamer 7.1 sound card into the PCI slot between the two PCI-E X16 graphics card slots.

The water cooling system is very tidy, considering there are two systems installed, with no kinks in any of the 0.5in tubing. The top two 5.25in drive bays of the case are filled with the water tanks, the top one of which can be filled via a hole in the top of the case, protected by a large rubber flap. The two radiators for the systems sit neatly under the roof of the case.

Cyberpower has used an HAF 932 Coolermaster case, which has some good tool-free features. Because of the water tanks, only one of the 5.25in drive bays is free. The other is used by an LG Super Multi Blu-ray/HD-DVD combo optical disc burner.

The main system disk is made up of two Western Digital WD1500 150GB, 10,000rpm Velociraptor drives in a Raid 0 array for a fast 300GB system disk. A 750GB Samsung HD753LJ drive gives extra storage.

It's a colourful beast when you open the side panel and switch it on. The dye in the blue coolant is UV reactive, as are the Sata data cables, so both glow blue under the two cathode tubes installed in the case. The huge 200mm cooling fan sitting between the front bezel and the 3.5in drive cage is lit by red LEDs and if that wasn't enough, the Tagan 1,300W power supply has different coloured LEDs lighting the back of the power connectors. The side panel is a mixture of mesh and Perspex so this light show isn't hidden away.

The Hydra isn't the quietest of systems, but gamers and enthusiasts will generally swap peace and quiet for performance.

Verdict

Pros Best-performing system using Intel's previous generation technology. Excellent water cooling
Cons A fair bit of fan noise
Overall If you are not put off by fan noise, want a fast system based around technology that has long proved its reliability and stability, and is still capable of playing the latest games well, then look no further

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

PC Specialist Vortex

Price £2,749 **Contact** PC Specialist 0844 499 4000 www.pcspecialist.co.uk

Its power and size makes the Vortex a good choice

The Vortex from PC Specialist uses the current flagship of the Core i7 family of processors – the 965 – and, although not overclocked like others in this group, it's still a very fast system.

It's another Core i7-based system that uses the P6T Deluxe motherboard from Asus, which was the first board marketed around the new Intel Socket 1366 and the X58/ICH10R chipset combination. The Vortex comes with three 2GB modules of fast Corsair XMS3 DDR3 1,333MHz memory but if this isn't enough, the board can support up to 12GB of memory via the six Dimm slots.

Although the motherboard supports either ATI Crossfire or Nvidia SLI graphics card setups, PC Specialist has, like most of the others in this group, gone for the ATI option with two MSI-branded ATI HD Radeon HD4870 X2 cards in a Crossfire configuration. The X2 version of the HD4870 features dual GPU cores so in this setup you have four graphics processors. As you can imagine, you can play any of the current gaming titles at higher resolutions without sacrificing too much in-game detail and still have playable frame rates, or you can use the four outputs to power four screens to get more realism for your flight simulator antics.

There is no separate audio card fitted; PC Specialist instead has relied on the onboard audio supplied on the motherboard, which isn't a bad option as the eight channel ADI AD2000B Codec supports DTS and Asus' Crystal Sound, which enhances speech-based apps such as Skype and videoconferencing.

PC Specialist has given the Vortex plenty of storage space: not only do you get one of Western Digital's blisteringly fast 150GB Velociraptor drives just for the Windows Vista Home Premium 64-bit operating system and applications, but there is a separate 1TB Samsung drive for your files. To help keep the disks free of clutter and to do the all-important backups or to watch your favourite movie, there is an LG Super Multi Blu-ray/HD-DVD combo optical disc burner. Also installed is a 52-in-1 Flash-card reader.

With this much hardware you need a good reliable power supply, which is sometimes overlooked. But PC Specialist hasn't skimped in this department, as there is an FSP Everest Pro 1,200W modular power supply unit sitting in the base of the case.

Talking of cases, the Vortex is another system to use a Coolermaster case. On this occasion it is the massive Cosmos 1000 that, because of its size, has loads of spare drive bays for any additional drives you might want to add at a later date.

Despite the five case fans, the CPU cooler fan and two graphics card fans, the Vortex is quieter than you might expect.

Verdict

Pros Performance and build quality
Cons Case is massive
Overall A well put-together system using top-notch components with plenty of future-proofing

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

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Name(s) of account holder(s) .....

Branch Sort Code .....

Account Number .....

Signature(s)..... Date .....

DIRECT Debit

Originator's Identification number

9	4	2	5	7	9

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Wired2Fire Diablo Extreme

Price £3,299 **Contact** Wired2Fire 0845 388 9051 www.wired2fire.co.uk

Performance is good but Diablo's price is Extreme

Powered by an overclocked i7 965 running at 3.7GHz instead of the standard 3.2GHz, Wired2Fire's Diablo Extreme performs very well and remains stable, even with the CPU running under normal air cooling.

This is another system that uses Asus' P6T Deluxe motherboard, which has an i7 965 sitting under a stock Intel cooler to do a really good job of keeping the CPU cool. Three of the motherboard's six Dimm slots are filled by Corsair XMS3 1,333MHz DDR3 memory modules, in this case a 6GB TR3X6G1333C9 memory kit.

The system is built into the latest incarnation of Coolermaster's huge Cosmos case, the S. The case design aids a neat system and Wired2Fire has taken advantage of this to make the Diablo Extreme a very well put-together unit.

Powering the graphics is a pair of ATI HD Radeon HD4870 X2 cards set up in a Crossfire configuration, so all today's games can be played at high frame rates with a lot of in-game detailing. Also aiding the gaming experience is the soundcard Wired2Fire has chosen for the Diablo Extreme.

Asus' Xonar HDAV 1.3 Deluxe is not only a 7.1 audio card but is also compatible with HDMI 1.3a and can send 24-bit 192KHz audio through its two HDMI ports. It supports 24-bit recording and playback up to 192KHz and Dolby TrueHD, Dolby Digital Plus and DTS.

For fast gaming, having a fast hard disk system keeps load times for large files such as maps down to a minimum, and Wired2Fire has made sure there are no hiccups with the Diablo Extreme. The main storage is provided by a pair of 300GB Western Digital Velociraptor drives, which, with a spin speed of 10,000rpm and 32MB cache, are the fastest disk-based drives currently available. These are built into a RAID 0 array, giving a very fast 600GB disk for the installed Windows Vista Home Premium 64-bit operating system to sit on. A third drive, a 1TB Samsung HD103UJ, is there to store all your files and photos. Two optical drives are fitted, an Asus 18-speed DVD-Rom and a LG GGC-H20L Super Multi six-speed Blu-ray/three-speed HD DVD combo burner.

Sitting in the bottom of the case is an 80Plus Coolermaster 1,000W power supply, which stops spare cables getting in the way.

Should you want to add more drives at a later date it's a simple matter to plug in another power cable; drives are about the only thing you can add to the system as the motherboard's expansion slots are either filled or blocked by the graphics cards.

The system is remarkably quiet, but this is down to the 120mm case fans and a large 230mm fan in the side panel – the larger the fan, the slower it spins.

Verdict

Pros Superb performance and build quality

Cons Nothing apart from the size and the price

Overall Fast, well-featured and relatively quiet for a high-end performance system with plenty of future-proofing

Features	★★★★★
Performance	★★★★★
Value for money	★★★★☆
Overall	★★★★☆

Enthusiast PCs

MANUFACTURER	ACER	CHILLBLAST	CYBERPOWER	PC SPECIALIST	WIRED2FIRE
Model name	Aspire Predator G7700 Crusher	Fusion Scorpion	Liquid Gamer Infinity Hydra	Vortex	Diablo Extreme
Price	£2,543	£2,874	£3,499	£2,749	£3,299
Delivery charge	Retailer dependent	£24	Free	Free	£29
Sales telephone	0870 853 1005	0845 456 7830	0191 497 8340	0844 499 4000	0845 388 9051
URL	www.acer.co.uk	www.coolermaster.com	www.cyberpower system.co.uk	www.pcspecialist.co.uk	www.wired2fire.co.uk
HARDWARE					
Processor	Intel Core 2 Extreme QX9650	Intel Core i7 940 OC	Intel Core 2 Quad Q9650	Intel Core i7 965 Extreme	Intel Core i7 965 Extreme OC
CPU speed	3GHz	2.93GHz overclocked to 3.58GHz	3GHz overclocked to 3.9GHz	3.2GHz	3.2GHz overclocked to 3.7GHz
Motherboard	Acer MC72XE	Asus Rampage II Extreme	Foxconn Black Ops	Asus P6T Deluxe	Asus P6T Deluxe
Chipsets	Nvidia Nforce 780i SLI SPP/780i MCP	Intel X58/ICH10R	Intel X48/ICH9R	Intel X58/ICH10R	Intel X58/ICH10R
Ram and speed	4GB/PC2-6400 800MHz	6GB/PC3-8500 1,333MHz	8GB/PC3-1,600MHz	6GB/PC3-8500 1,333MHz	6GB/PC3-8500 1,333MHz
Ram manufacturer & model	Transcend TX1066QLU-2G	Corsair Dominator CM3X2G1333C9D ES1	Corsair CM3X2G1600C9DHX	Corsair Platinum TR3X6G1333C9	Corsair Platinum TR3X6G1333C9
Occupied/spare memory slots	2/2	3/3	4/0	3/3	3/3
Hard disk manufacturer & model	Western Digital WD1500ADFD Raptor	2 OCZ Core SSD (RAID 0)	2 Western Digital WD1500 (Raid 0)	Western Digital WD1500	2 Western Digital WD3000GLFS (Raid 0)
Capacity/spin speed	150GB/10,000rpm	2 30GB/0rpm SSD	2 150GB/10,000rpm	150GB/10,000rpm	2 300GB/10,000rpm
Second hard disk manufacturer & model	2 Western Digital WD6400AAKS	Seagate ST31500341AS	Samsung HD753LJ	Samsung HD103UJ	Samsung HD103UJ
Capacity/Spin speed	2 x 640GB/7,200rpm	1,500GB/7,200rpm	750/7,200rpm	1,000GB/7,200rpm	1,000GB/7,200rpm
Total capacity	1.43TB	1.56TB	1.15TD	1.15TB	1.60TB
Case	Acer	Antec Twelve Hundred	Coolermaster HAF 932	Coolermaster Cosmos	Coolermaster Cosmos S
Power supply manufacturer/output	Delta GPS-750AB/750W	Coolermaster Real Power Pro 1250/1,250W	Tagan BZ 1300/1,300W	FSP Everest Pro 1200/1,200W	Coolermaster Real Power M1000/1,000W
EXPANSION AND I/O					
No of 3.5/5.25in bays	4/2	9/3	6/5	6/5	5/7
Free 3.5/5.25in bays	1/0	6/2	2/1	4/4	2/5
No of PCI/PCI-x16/ PCI-x4/PCI-x1 ports	1/3 (1 x 8)/0/2	1/3/0/1	3/3/0/0	2/3/1/0	2/3/1/0
Free PCI/PCI-x16/ PCI-x4/PCI-x1 ports	0/1/0/1	1/0/0/0	0/1/0/0	1/1/1/0	1/1/0/0
USB2/Firewire ports	8/1	8/2	10/2	12/1	12/1
Other ports	2 eSata, 6 x audio, 1 S/PDIF	2 eSata	3 eSata, 2 S/PDIF	2 eSata, 2 S/PDIF	2 eSata, 2 HDMI, 2 S/PDIF
Serial/parallel/PS/2 ports	0/0/2	0/0/1	0/0/2	0/0/1	0/0/1
MULTIMEDIA					
Optical drive (s)	Lite-On DH401S/Hitachi GH-15N	LG GGC-H20L	LG GGC-H20L	LG GGC-H20L	Asus DVD-E818AT/LG GGC-H20L
Optical drive formats & DVD write speed (max)	4x BD-Rom/Not specified	6x BD-Rom, 3x HD-DVD	6x BD-Rom, 3x HD-DVD	6x BD-Rom, 3x HD-DVD	18x DVD/6x BD-Rom, 3x HD-DVD
Soundcard	Integrated Realtek HD/7.1	Creative X-Fi	Creative X-Fi Xtreme Gamer/7.1	integrated ADI AD2000B/7.1	Asus Xonar HDAV 1.3 Deluxe/7.1
Graphics type/memory	2 Nvidia Nforce 9800GTX/ 2 512MB	2 ATI Radeon HD4870 X2/ 2 1GB	2 ATI Radeon HD4870 X2/ 2 1GB	2 ATI Radeon HD4870 X2/ 2 1GB	2 ATI Radeon HD4870 X2/ 2 1GB
Screen outputs (DVI, VGA, S-video, HDMI etc)	4 DVI/I (HDMI, HDCP compliant), 2 S-Video	4 DVI/I (HDMI, HDCP compliant), 2 S-Video	4 DVI/I (HDMI, HDCP compliant), 2 S-Video	4 DVI/I (HDMI, HDCP compliant), 2 S-Video	4 DVI/I (HDMI, HDCP compliant), 2 S-Video
OTHER INFORMATION					
Additional hardware	52-in-1 card reader	None	CPU & graphics water cooling kits	52-in-1 card reader	None
Network	10/100/1,000 Gigabit	Dual 10/100/1,000 Gigabit (Marvell 88E8056)	Dual 10/100/1,000 Gigabit (Broadcom)	Dual 10/100/1,000 Gigabit (Marvell 88E8056)	Dual 10/100/1,000 Gigabit (Marvell 88E8056)
Operating system	Windows Vista Home Premium SP1 32-bit	Windows Vista Home Premium SP1 64-bit	Windows Vista Home Premium SP1 64-bit	Windows Vista Home Premium SP1 64-bit	Windows Vista Home Premium SP1 64-bit
Bundled software	Microsoft Office Trial, Microsoft Works 8.5	None	None	CyberLink PowerDVD, Hi-Def Suite	None
Standard warranty*	1yr RTB	2yr C&R	3yr RTB	1yr RTB (1 month free C&R)	1yr P&L, 2nd year labour
SCORES					
Features	★★★☆☆	★★★★☆	★★★★☆	★★★★☆	★★★★★
Performance	★★★☆☆	★★★★★	★★★★☆	★★★★☆	★★★★★
Value for money	★★★☆☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆
OVERALL	★★★☆☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆

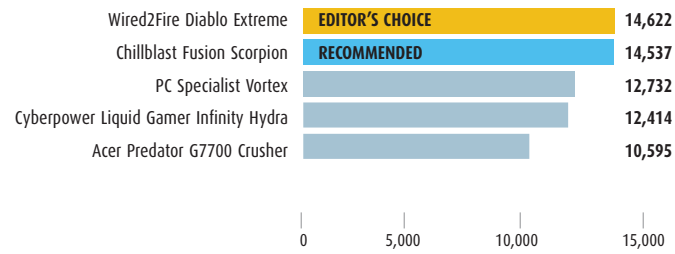
*RTB = Return to base, C&R = Collect and return, P&L = Parts and labour.

Vendors of group test products are only obliged to sell them at the prices quoted here (which include credit card surcharges) for the life of this PCW issue. They may also change components in certain circumstances.

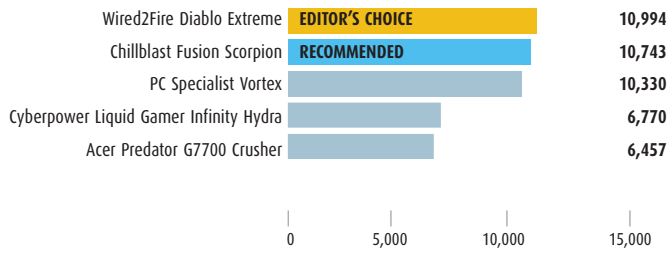
Lab results

The Diablo Extreme and Fusion Scorpion scored well in all our tests, but the Hydra did well on hard drive and the Vortex got top marks on Vantage Extreme Overall

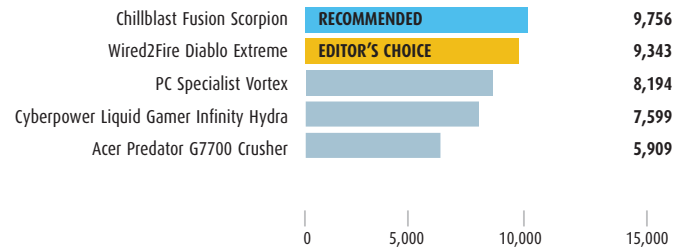
PCmark05 Overall



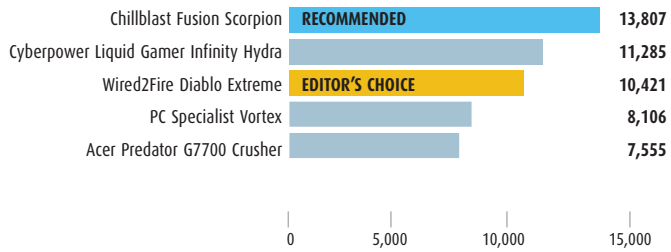
PCmark05 Memory



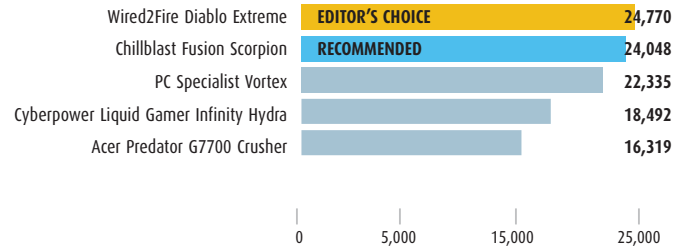
PCmark05 Vantage Overall



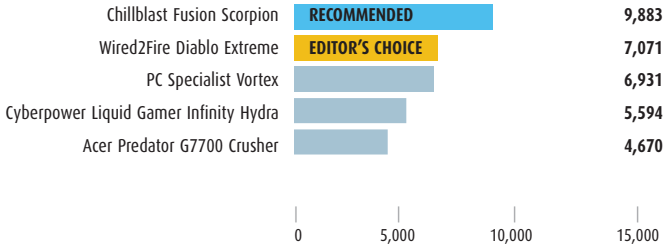
PCmark05 Hard Drive



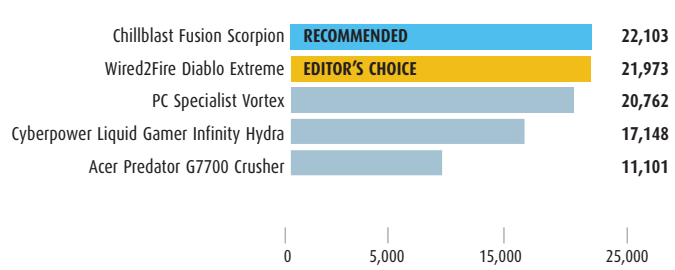
3Dmark06 Overall (1,280x1,024 in 32-bit colour)



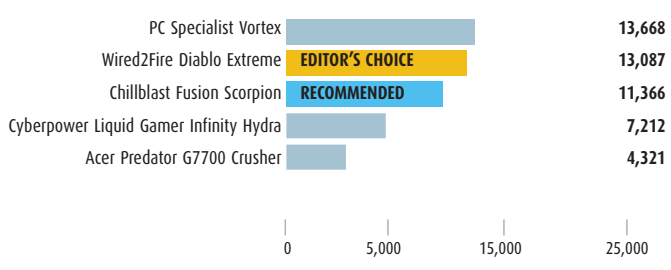
PCmark05 Vantage Hard Drive



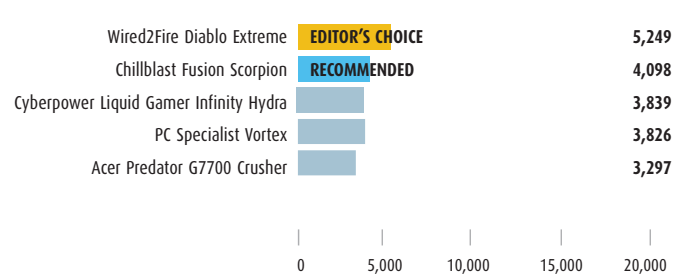
3Dmark06 Vantage Performance Overall (1,280x1,024 in 32-bit colour)



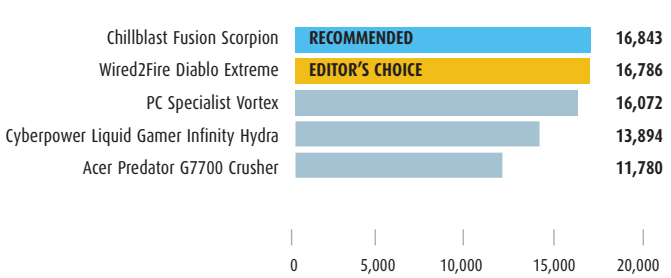
3Dmark06 Vantage Extreme Overall (1,920x1,200 in 32-bit colour)



Cinebench X single-core



Cinebench X multi-core



Please see page 69 for an explanation of how we tested the PCs

What makes Core i7 special

Previously known under its code name of Nehalem, Intel's latest Core i7 processors see the end of the faithful LGA775 socket. It's replaced by the new larger LGA1366 socket. But while one old friend disappears, another makes a return – Hyperthreading is back, giving two logical cores to each CPU. So a quad-core i7 appears to the operating system and software as having eight logical cores.

Unlike the Core 2 designs where two dies were joined together to produce a quad-core processor, the new design, although still using the 45nm manufacturing process, uses a single silicon die. This makes the design more efficient in terms of total die area: the die size for the new Core i7 is 263mm^2 and it contains 731 million transistors. As well as the usual Level 1 and 2 caches for each core (each 256KB in size), there's 8MB of shared Level 3 cache.

Another of the bottlenecks of the old Core 2 design has disappeared, namely the memory controller hub (MCH) sitting in the northbridge of the chipset. The new triple-channel DDR3 controller sits on the CPU itself (just like AMD processors), which makes for better performance as the data requests are loaded straight from the system memory into the CPU. Also aiding fast data transfer is the new Quick Path Interconnect or QPI, a single point-to-point connect to the chipset, similar to AMD's Hyper Transport link.

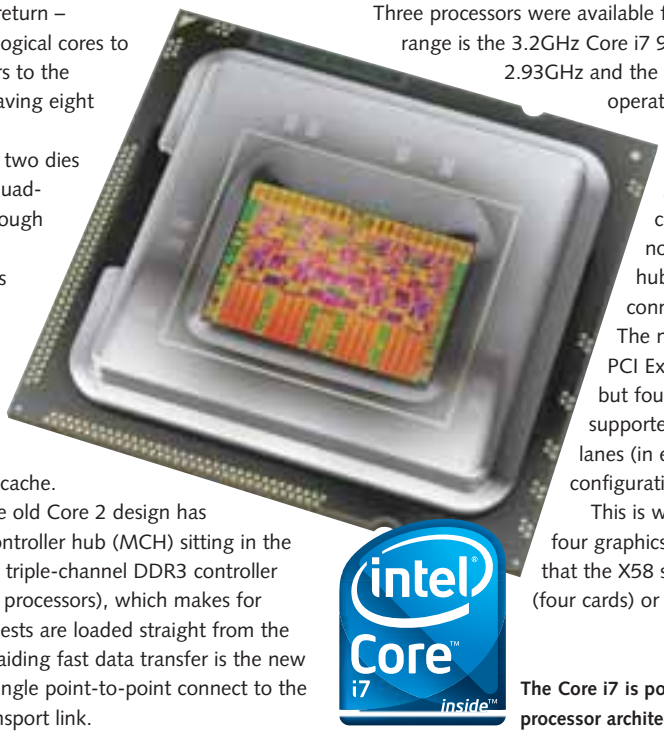
Power management has got smarter with the introduction of dynamic clock frequency changes, called Turbo Boost – a topic we'll look at in more depth in next month's *PCW*.

Three processors were available from launch. The flagship of the range is the 3.2GHz Core i7 965 Extreme. The i7 940 runs at 2.93GHz and the i7 920 is the baby of the family, operating at 2.67GHz.

X58 chipset

As it has relinquished its memory controller work, the northbridge is now known as IOH (input/output hub) instead of the MCH. It's connected to the CPU via the QPI. The new chipset supports 36 lanes of PCI Express compared to the X48's 32, but four PCI Express ports must be supported in either 16 lanes (1x16) or 32 lanes (in either 2x16, 4x8, 1x16 or 2x8 configurations).

This is why the new chipset supports up to four graphics cards – and the good news is that the X58 supports either AMD's Crossfire X (four cards) or three-way Nvidia SLI.



The Core i7 is possibly Intel's most important new processor architecture in the past 10 years

Editor's Choice

Editor's Choice Wired2Fire Diablo Extreme
Recommended Chillblast Fusion Scorpion

Wired2Fire Diablo Extreme

Chillblast Fusion Scorpion

If anything shows just how much of a performance advantage Intel's new CPU and chipset architecture brings to the desktop, it's our PCmark05 memory test results. These clearly show the benefit of the new integrated memory controller and triple-channel DDR3 memory. For example, compare Cyberpower's Core 2 quad-powered Liquid Gamer Infinity Hydra, which is no slouch, against even the lowest scoring i7 system, with PC Specialist's Vortex: the Vortex scores over 3,500 points more in this test. But if you're one of the many people who prefer the latest technology to mature a little before parting with cold hard cash, but still want a fast gaming system then the Cyberpower system is the one to look at.

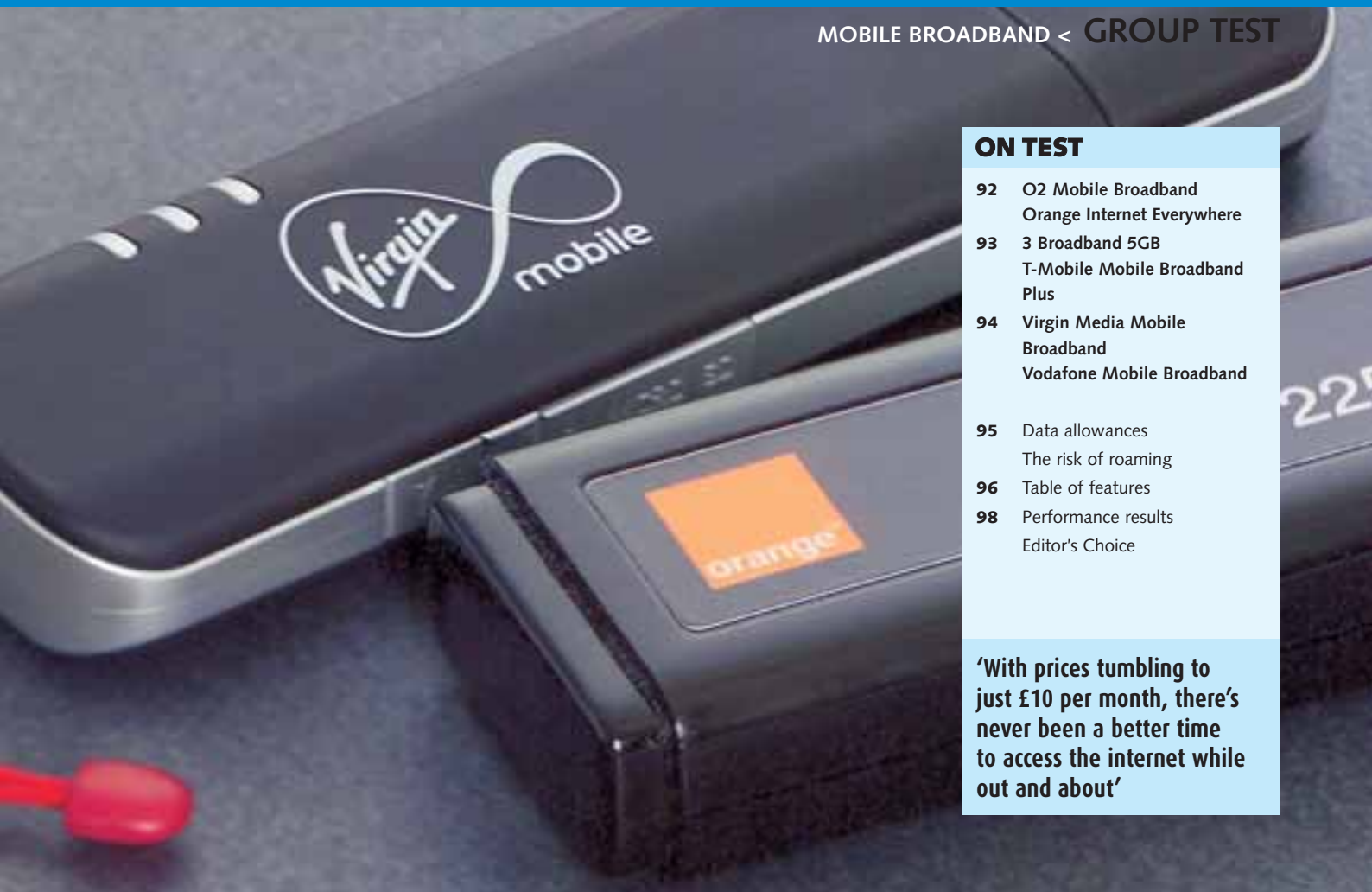
Trying to decide the winner between the remaining three Core i7 systems is a little more problematic, as they are all stunningly fast, stylish, well-featured and surprisingly quiet PCs that offer a good degree of future-proofing.

It's wrong to call it basic, but compared to the other two systems PC Specialist's Vortex has fewer features. That's good news if you want to use it as a starting base to build on, in which case it's a better option than the other two.

Chillblast's Fusion Scorpion shows just how overclockable the new CPUs are, with a 2.93GHz processor running stably at 3.58GHz on nothing more exotic than air cooling, and it's also interesting to see how SSDs are being used in Raid arrays for fast access of files during application loading, particularly games. In light of this we've given it a well-deserved Recommended award, but by a narrow margin our Editor's Choice goes to the Wired2Fire Diablo Extreme.

With its great mix of top-notch hardware and superb performance it will keep you playing games at high frame rates, or other demanding tasks, for quite some time, even though the price tag may be a bit daunting. **PCW**

vodafone
O2
T-Mobile
3



ON TEST

92 O2 Mobile Broadband
Orange Internet Everywhere
93 3 Broadband 5GB
T-Mobile Mobile Broadband Plus
94 Virgin Media Mobile Broadband
Vodafone Mobile Broadband

95 Data allowances
The risk of roaming
96 Table of features
98 Performance results
Editor's Choice

'With prices tumbling to just £10 per month, there's never been a better time to access the internet while out and about'

Speedy surfing in the street

With plenty of great deals, is mobile broadband set to take over from the fixed line? Will Stapley puts the networks to the test

Once prohibitively expensive, mobile broadband is now fast-becoming one of the most popular laptop add-ons. With prices tumbling to just £10 per month and various cheap pay-as-you-go deals available from network operators, there's never been a better time to access the internet while out and about. Mobile broadband is also a great backup for your fixed-line internet connection – if coverage is good in your area, it can even replace it as your sole broadband connection.

Each network operator has a huge range of deals to choose from. To create as level a playing field as possible for this group test, we've selected each operator's current £15 per month, 18-month contract deal.

Speed is possibly the biggest issue when it comes to mobile broadband, and certain operators really aren't helping themselves, or the industry as a whole, by quoting wildly unrealistic data transfer figures. We've provided graphs to indicate the throughput we achieved with each device in two quite different test locations, although the speeds you experience are almost certain to differ from these – you can find out more about this from our test results page 98.

We'll also take a close look at what happens if you go over your chosen package's monthly data allowance, as well as how much it's likely to cost if you indulge in a bit of web browsing while abroad.

↘

O2 Mobile Broadband

Price £15 per month **Contact** O2 0844 202 0202 www.o2.co.uk

Installing O2's mobile broadband package didn't throw up any problems, although the message warning us that Vista's UAC was disabled, along with instructions on how to re-enable it, was a bit odd. The software doesn't give a huge amount of information, leaving you to open up separate windows to see details such as connection statistics. It also took a relatively long time to connect – more than 30 seconds each time we used it.

Currently O2 only supports HSDPA at 3.6Mbits/sec, although it plans to introduce 7.2Mbits/sec in London and other parts of the UK in 2009. It's a similar story with HSUPA uploads – not supported yet, but coming soon. In our tests, though, it performed reasonably well, averaging at 1.5Mbits/sec in central London.

Along with mobile broadband, access to Wifi hotspots provided by The Cloud are included in the price – check out **www.thecloud.net** to see if there are any near you.

The software keeps things simple; a nice touch is the database of Wifi hotspots, which can be set to update automatically.

O2 told us it applies compression to various types of traffic to increase efficiency, and we noticed some nasty image compression during testing. Press F5, and when the page reloads the compression will be gone, but it's frustrating.

A decent selection of accessories is included in the package. Not only do you get a clip to attach the USB key to your laptop's monitor, but the extension cable houses a pass-through USB port – good for those who have laptops with a small number of USB ports.

The free access to The Cloud hotspots might be enough to swing it for some, but its image compression and current lack of support for HSUPA and 7.2Mbits/sec HSDPA means it languishes behind some of the other packages in terms of performance.

Verdict

Pros Access to The Cloud Wifi hotspots included

Cons Image compression; no HSUPA

Overall Free use of The Cloud hotspots is impressive, but overall performance is nothing special

Features	★★★★☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Orange Internet Everywhere

Price £15 per month **Contact** Orange 0800 079 2000 www.orange.co.uk

As with all but one of the packages on test, Orange's £15-per-month service comes with a 3GB data allowance. However, out-of-bundle data charges are expensive. Go over your usage limit of 3GB and you'll be charged 1.46p per megabyte – the saving grace is that, unlike with Vodafone, you are charged per megabyte and not per gigabyte.

Orange could certainly do with streamlining the software it uses. During installation we were instructed not to plug in the USB modem until the software installation was complete (it obviously failed to detect we were actually installing the software direct from the USB modem), and it was the only package to request a reboot once setup was complete – if you regularly install it on different laptops this will be a pain. There were also times when the software refused to connect, despite there being a good signal, probably as a result of contention.

Orange told us that it has HSDPA services up to 7.2Mbits/sec; however, its website states 3.6Mbits/sec. Regardless, we weren't able to get more than 2Mbits/sec in either of our test locations, although its average speeds were reasonably impressive. There's no HSUPA support at present – we're told this will arrive in 2009 – so uploads stuck around the 350Kbits/sec mark, which isn't too bad.

Although FTP will work, Orange doesn't allow VoIP or VPN via its Internet Everywhere service, which is disappointing.

Despite managing to achieve some decent download speeds both in and out of London, the software Orange uses leaves a bad taste in the mouth and is badly in need of an update – it certainly pales in comparison to the streamlined offering from Vodafone, which didn't cause a single problem during testing. And with no inclusive Wifi hotspot usage to sweeten the deal, there are better alternatives on offer.

Verdict

Pros Reasonable speeds

Cons Poor software utility; occasionally refused to connect during busy periods

Overall Reasonable speeds, but its poor software utility holds it back

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

3 Broadband 5GB

Price £15 per month **Contact** 3 0800 358 6946 www.three.co.uk

Whereas all the other packages on test offer a 3GB data allowance in return for a £15-per-month contract over 18 months, 3 provides 5GB of inclusive usage. Unless you do a lot of iPlayer watching or movie downloading, you should be able to stay below this limit.

Our review kit consisted of a Huawei E169G USB modem. Although this supports download speeds up to 7.2Mbits/sec, 3's network currently has a theoretical maximum of 3.6Mbits/sec – it is, however, upgrading major cities to the faster standard, so this modem will future-proof you to a certain extent.

Unlike many other operators, 3 doesn't use the 3.6Mbits/sec figure in its advertising, instead opting for a slightly more realistic figure of 2.8Mbits/sec. However, during testing we rarely got above 1Mbits/sec in London. Outside London, it was barely better than a dial-up connection, even when the software told us we were in an HSDPA area with full coverage. Upload speeds were similarly disappointing and appeared to be capped at 55Kbits/sec, which is woefully slow.

On the positive side, 3 hasn't indulged in any image compression to boost its perceived speeds – all images on websites are just as they would be if viewed on a fixed-line connection. The software is also relatively easy to use and quick to connect.

3 offers the most generous usage allowance in this group and it's one of the cheapest should you go over this limit, with a charge of 10p per megabyte. International roaming charges are middle-of-the-road, at £3 per megabyte when in the EU and £6 per megabyte for the rest of the world. 3 also offers a 'like home' service in a small selection of countries, where it has sister networks.

We were impressed with its generous 5GB data allowance, but ultimately left very disappointed with 3's average speeds during testing.

Verdict

Pros 5GB data allowance; no visible image compression

Cons Slow speeds; upstream particularly bad

Overall We like the generous 5GB allowance, but poor speeds marred the overall experience

Features	★★★☆☆
Performance	★★☆☆☆
Value for money	★★★★☆
Overall	★★★☆☆

T-Mobile Mobile Broadband Plus

Price £15 per month **Contact** T-Mobile 0800 956 2208 www.t-mobile.co.uk

As well as HSDPA, the T-Mobile package supports HSUPA, which enables theoretical upload speeds of 1.4Mbits/sec. This is faster than most fixed-line broadband services, and if you're frequently uploading photos or sending emails with large attachments, upload speeds can be just as important as downloads.

During our tests, we managed to get the connection syncing at 7.2Mbits/sec, but T-Mobile has opted to quote a slightly slower maximum speed of 4.5Mbits/sec in major conurbations. Naturally we weren't able to get anywhere close to this speed, and the average of 1.1Mbits/sec outside London wasn't great. Speeds were a fair bit faster in our central London test location, however we weren't overly impressed with T-Mobile's HSDPA coverage. Near London Victoria station, we had to traipse around the streets to find a spot where the connection didn't drift in and out of HSDPA speeds.

Since T-Mobile has a large number of Wifi hotspots in cafes, airports and hotels, it's no surprise to find that unlimited usage of these is included in the price, which is most definitely a bonus. However, you have to upgrade to the more expensive Mobile Broadband Max service if you want to use VoIP, VPNs or FTP.

T-Mobile takes a slightly different approach to usage allowances, quoting a 3GB fair usage allowance. This means that if you go over 3GB, T-Mobile may restrict how you use your plan in future, most likely in the form of capping your connection speeds. It might be a little vague, but we much prefer this approach since it means you won't be stung if you accidentally leave video streaming on your laptop, for example.

With decent speeds, no out-of-bundle charges and inclusive use of its Wifi hotspots, T-Mobile's service is well worth considering, but the lack of VoIP support on this package is disappointing.

Verdict

Pros Inclusive use of T-Mobile's hotspots; decent speeds; no out-of-bundle charges

Cons Poor HSDPA coverage during our tests; no VoIP support

Overall A good all-round service with free use of T-Mobile's network of Wifi hotspots

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆
Overall	★★★★☆

Virgin Media Mobile Broadband

Price £15 per month **Contact** Virgin Media 0845 650 4500 www.virginmedia.com.shrunk

Unlike the other five services in this group, Virgin Media doesn't have its own mobile network. Instead, it makes use of T-Mobile's network to provide both voice and data services, and this includes its new mobile broadband package. This means Virgin Media can make use of T-Mobile's HSDPA and HSUPA services, however you don't get free access to T-Mobile's Wifi hotspots. It's no great surprise that the software provided is almost identical to T-Mobile's too.

We were supplied with a Huawei E160 USB modem – as well as looking reasonably stylish, this is the only modem to include an external aerial socket, which could come in handy if you're in a poor reception area. It also features a Micro SD card slot, enabling you to transfer data quickly to and from a compatible mobile phone.

We achieved some reasonable speeds with Virgin's service, both in and out of London. Since it uses T-Mobile's infrastructure, the similar download speeds weren't a surprise, but we did notice the upload speeds to be consistently slower, particularly in London. As with T-Mobile, finding HSDPA coverage in central London wasn't as easy as we'd hoped.

Should you go over the 3GB cap, Virgin will hit you with a £15 per gigabyte fee, which effectively doubles the monthly charge if you go just 1MB over the limit – far too draconian for our liking.

Image compression is applied, although a quick Ctrl and F5 keypress reveals the uncompressed version. Although not documented, T-Mobile's Accelerator application, which lets you turn off this compression, works with Virgin Media's service, so there is a way around it – although having to download and run a separate application is annoying.

It might be reasonably fast, but with its hefty out-of-bundle data charging there are better alternatives.

Verdict

Pros Easy to install and use; USB modem features built-in card slot
Cons No VoIP support; no Wifi hotspot usage included; high out-of-bundle data charge
Overall A very similar service to T-Mobile, but without the Wifi hotspots included

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★☆☆
Overall	★★★★☆

Vodafone Mobile Broadband

Price £15 per month **Contact** Vodafone 0808 004 4423 www.vodafone.co.uk

First impressions of Vodafone's mobile broadband service were good when the software loaded almost instantaneously and then took just a few seconds to connect.

Although some of the other operators tick the HSUPA box, it was only with Vodafone that we actually experienced a decent boost in speed. Vodafone told us that wherever a 7.2Mbits/sec HSDPA connection is available, so too will be 1.8Mbits/sec HSUPA uploads.

When we tested both in and out of London, we were impressed with the fast uploads – outside London we managed to regularly get more than 1Mbits/sec, a figure that beat the rest by a mile. Download speeds were similarly nippy, with around 1.5 to 2Mbits/sec being the norm.

Vodafone has a similarly expensive out-of-bundle data charging policy to Virgin Mobile. Go just 1MB over and you'll get a £15 fee added to your bill – this is something that Vodafone needs to seriously reconsider. The company has often been criticised for its use of image compression, and it told us this process is still applied and there's no way to turn it off. However, during our testing there was no noticeable compression, which was odd.

If you're in the habit of losing USB caps, the Huawei E172 supplied with this package has the cap tethered to the USB key, which is a nice touch. Vodafone's website states that the key has a micro SD slot, but our review sample didn't – if you need such a slot, it's best to confirm with Vodafone before ordering.

We don't like Vodafone's method of charging £15 if you stray over your allowance, but in our tests it was clearly top dog in terms of speeds, with the consistently fast uploads being particularly impressive. Of course, as with all the other packages on test, the speeds you manage to achieve will depend on various other factors.

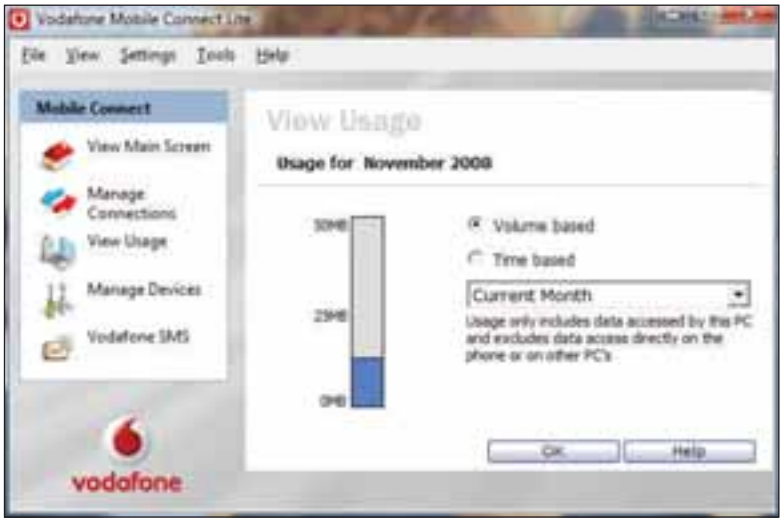
Verdict

Pros Consistently fast download and upload speeds; good software
Cons Hefty fee if you exceed your data allowance
Overall Vodafone provided us with the best mobile broadband experience, but it needs to reconsider its out-of-bundle charging

Features	★★★★☆
Performance	★★★★★
Value for money	★★★★☆
Overall	★★★★☆

Data allowances

All the mobile broadband packages in our group test come with restrictions on the amount of data you can download in a single month. Some will charge you for exceeding your limit, the penalty reflecting how far in excess you are, others will simply monitor by how much you go over and, if they deem it necessary, place restrictions on your account. All but one of the packages on test feature a 3GB cap – most also offer cheaper 1GB alternatives. But how feasible is it to stay within a 3GB limit?



Most networks enable you to view your data usage for the month to date on their websites

If you're browsing simple websites and checking emails, you'd need to be very busy to get anywhere near a 3GB cap. However, it's all too easy to run seemingly innocent applications that will start eating into your allowance much quicker.

Aside from downloading huge files using Bittorrent, for example, streaming video is one of the biggest culprits. Spend a while flicking through video clips on Youtube or catching up on TV programmes using the BBC iPlayer and you'll soon start racing towards the upper end of your data cap. Then you've got software updates, which are often performed in the background without you knowing. Add to this the occasional Windows Service Pack and 3GB starts to look a little less generous.

Our advice is to try to use an alternative broadband connection wherever possible when downloading software updates. If you have a cable or ADSL broadband line at home, then be sure to use that instead of your mobile broadband account when Windows wants to download a new Service Pack, for example.

And if you have a contract with T-Mobile or O2, it's worth taking advantage of their free Wifi hotspot access to download any large files.

Although most network operators have typical usage calculators on their websites, it's impossible to come up with a definitive guide as to how much each type of internet activity uses up. For example, 100 emails could total as little as 2MB, but if they contain large attachments then total size could easily stretch to well in excess of 100MB. Similarly, viewing simple websites will barely make a dent in your allowance, but if BBC iPlayer is one of your favourites, you need to bear in mind that a 30-minute session could use up 300MB. If you want to gauge your internet usage before signing up to a limited-use service, use one of the many free monitoring applications, such as Netmeter (**www.metal-machine.de/readerror**).

The risk of roaming

Given the often exorbitant charges associated with using a mobile phone when abroad, it will come as no surprise to find that using mobile broadband when travelling is similarly expensive. Although pressure from the EU has seen prices drop, they're still way above what most people would deem acceptable.

T-Mobile currently offers the cheapest mobile broadband when it comes to EU-based roaming, with a charge of £1.50 per megabyte. However, unless you're simply checking your emails or taking a look at a couple of websites, total charges even at this rate will soon mount up; indulge in a bit of video streaming and you could easily end up saddled with a bill of well over £100.

O2 and 3 have a £3 per megabyte charge for EU roaming, while Orange (£4.11 per megabyte) just beats Virgin Mobile and Vodafone, both of which have a £5 per megabyte fee. And should your travelling take you outside of Europe, things will start getting even more expensive. T-Mobile may have the cheapest EU-based charges, but cross over the Atlantic and you'll end up paying a whopping £7.50 per megabyte – the heaviest charge of them all. Orange isn't far behind at £6.46 per megabyte, while O2 and 3 charge £6 per megabyte. Virgin Mobile and Vodafone offer the cheapest non-EU access, but at £5 per megabyte it's not exactly something most people would be happy to spend much time using.

Ultimately, our advice is to avoid using your mobile broadband while abroad whenever possible. If you do have to use it when travelling, try to make sure you know exactly what's going to be using your connection while you're online. A small software update of just 5MB could quite easily run in the background without you knowing – until you get slapped with a £37 bill.

One small crumb of comfort is that the EU is likely to put a cap on mobile broadband data charges next year, which should ease the pain of roaming.

Mobile broadband

MANUFACTURER	**3**	**O2**	
Model	Broadband 5GB	Mobile Broadband	
Price (per month with 18-month contract)	£15	£15	
Sales number	0800 358 6946	0844 202 0202	
URL	www.three.co.uk	www.o2.co.uk	
FEATURES AND PRICING			
Maximum quoted downstream (Mbits/sec)	3.6	3.6	
Maximum quoted upstream (Mbits/sec)	0.384	0.384	
Monthly data allowance	5GB	3GB	
Charges outside allowance	10p per MB	20p per MB	
EU roaming (per MB)	£3	£3	
Outside-EU roaming (per MB)	£6	£6	
FTP support	✔	✔	
VoIP support	✔	✔	
VPN support	✔	✔	
Included Wifi access	✘	Cloud hotspots	
Modem make and model (as tested)	Huawei E169G	Novatel Ovation MC930D	
Modem price	Free	Free	
Memory card slot	✘	✘	
Lanyard attachment	✔	✘	
External aerial socket	✘	✘	
Extras	USB extension cable	USB extension cable (inc extra USB port), clip stand	
Windows XP	✔	✔	
Windows Vista	✔	✔	
Mac OSX	✔	✔	
Linux	✔	✔	
SCORES			
Features	★★★☆☆	★★★★☆	
Performance	★★☆☆☆	★★★☆☆	
Value for Money	★★★★☆	★★★☆☆	
OVERALL	★★★☆☆	★★★☆☆	

	ORANGE	**T-MOBILE**	**VIRGIN MEDIA**	**VODAFONE**
	Internet Everywhere	Mobile Broadband Plus	Mobile Broadband	Mobile Broadband
	£15	£15	£15	£15
	0800 079 2000	0800 956 2208	0845 650 4500	0808 004 4423
	www.orange.co.uk	www.t-mobile.co.uk	www.virginmedia.com/shrunk	www.vodafone.co.uk
	3.6	7.2	7.2	7.2
	0.384	1.4	1.4	1.8
	3GB	3GB	3GB	3GB
	1.46p per MB	Fair-use policy*	£15 per GB	£15 per GB
	£3	£1.50	£5	£5
	£8	£7.50	£5	£5
	✔	✘	✔	✔
	✘	✘	✘	✔
	✘	✘	✔	✔
	✘	T-Mobile hotspots	✘	✘
	Option Icon 225	Huawei E170	Huawei E160	Huawei E172
	Free	£14.99	Free	Free
	✘	✘	Micro SD	✘
	✔	✔	✔	✔
	✘	✘	✔	✘
	USB extension cable, neck strap, clip stand	USB extension cable, neck strap, clip stand	USB extension cable	USB extension cable
	✔	✔	✔	✔
	✔	✔	✔	✔
	✔	✔	✔	✔
	✔	✔	✔	✔
	★★★☆☆	★★★★☆	★★★★☆	★★★★☆
	★★★☆☆	★★★★☆	★★★★☆	★★★★★
	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆
	★★★☆☆	★★★★☆	★★★★☆	★★★★☆

*Usage restrictions may be applied depending on the extent to which you exceed the limit and how often

Lab results

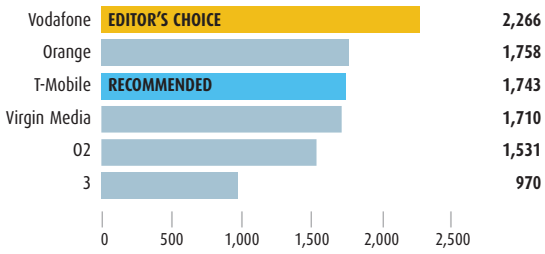
The Vodafone package's speeds were consistently impressive in all conditions while 3's downstream performance at Gatwick Airport was surprisingly poor

Due to issues such as contention and coverage, it's impossible to accurately predict the speeds of each service, however these results from two test locations indicate the sort of speeds you are likely to achieve.

The first location was London Victoria train station and the second near Gatwick Airport. Each provider indicated good HSDPA coverage in both locations and we ran each test a number of times, discarding any obvious anomalies and recording the average score. We tested outside traditionally busy periods to avoid contention issues. When we tested during weekday office hours, the speeds of all services varied each time we tested, often plummeting to well under 1Mbit/sec and occasionally not connecting at all. All services provided a similar experience during use on a train, with none able to provide a consistent service when on the move.

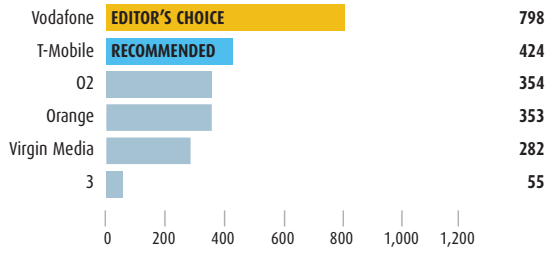
Central London – downstream (Kbits/sec)

Bigger is better



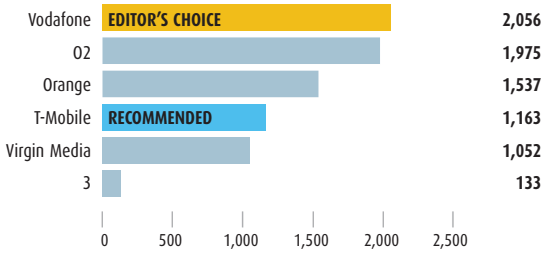
Central London – upstream (Kbits/sec)

Bigger is better



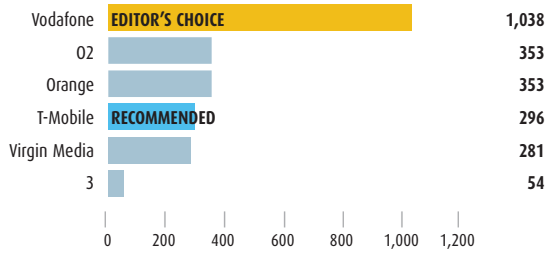
Gatwick Airport – downstream (Kbits/sec)

Bigger is better



Gatwick Airport – upstream (Kbits/sec)

Bigger is better



Editor's Choice

Editor's Choice Vodafone Mobile Broadband
Recommended T-Mobile Mobile Broadband

Vodafone Mobile Broadband

T-Mobile Mobile Broadband

It's important to stress once again that the speeds we achieved in our tests should not be taken as gospel, but they do indicate just how different speeds can be from the named theoretical maximums. The speeds you encounter will depend on the level of coverage in your area and how many other people there are using the same service in the vicinity.

That said, Vodafone's service consistently provided the best overall experience. Downloads were fast, often creeping over the 2Mbits/sec mark, but it was its HSUPA uploads that really impressed, and we frequently managed 1Mbit/sec and over. Its only real drawback is the out-of-bundle charging – if you stray as little as 1MB over the 3GB cap, Vodafone will impose a £15 fee.

If you like the idea of free access to Wifi hotspots both T-Mobile and O2 will appeal, and with T-Mobile managing to post the fastest speeds of the two it picks up a Recommended award. However, the lack of VoIP support, unless you sign up to its more expensive Mobile Broadband Max service, is disappointing.

There still seems to be a lot of confusion surrounding mobile broadband. On more than one occasion, company representatives provided us with information that conflicted with what was stated on their respective websites. We also can't help but feel that service providers are creating a rod for their own backs by touting speeds of up to 7.2Mbits/sec. All this does is raise people's expectations, leading them to believe mobile broadband could be faster than their fixed-line broadband connection at home. The fact is, you'll be very lucky to get more than 2Mbits/sec, and if you're using it while travelling, speeds will often slow to a crawl. If you do plan to use it as your sole broadband connection, we'd recommend making sure you keep a very close eye on usage – step over your data allowance and you could be in for a nasty surprise when the next bill arrives.

However, if you keep your expectations realistic, mobile broadband is hugely useful. And with speeds improving all the time, it could eventually take over from fixed-line services. **PCW**

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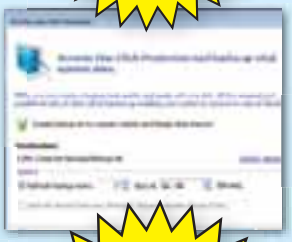

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(CODE PC13)

ON TEST

102 Advent Netbook 4213
Asus Eee PC S101
Dell Inspiron Mini 9
Elonex Webbook
103 Samsung NC10

103 Performance results
104 Table of features
Editor's Choice

'The five netbooks on test include long-awaited models from two of the biggest guns, Dell and Samsung'

Netbooks for web surfers

The new internet-focused super-portable mini-notebooks are coming thick and fast. Simon Crisp puts five through their paces

It is a measure of how fast the netbook market is growing that since our group test of eight of these portable miniature notebook computers in the Christmas issue of *PCW*, we have already received another five to review, one of which – the Elonex Webbook – only just missed the deadline for the last group test.

The other four on test are all very new to the market, including long-awaited models from two of the biggest guns, Dell and Samsung, with the Inspiron Mini 9 and the NC10 respectively.

The 4213 is the latest model to appear in Advent's netbook range and we also have the latest Eee PC from the company that started it all, Asus, in the shape of its upmarket, stylish and expensive S101.

But they're just the tip of the iceberg. Many more netbooks are available in the Far East, and some of them will be hitting our shores early in the new year.

Advent Netbook 4213

Asus Eee PC S101

Dell Inspiron Mini 9

Advent Netbook 4213

While Advent's previous netbook, the 4211, was based on MSI's popular Wind, its 4213 uses an ECS design and is altogether much slimmer-looking, although this does cause a few problems, particularly with the keyboard. If you liked the large keys of the 4211, you may well be disappointed by the ones on the 4213. The reason for the change is that the 4213's keyboard is not an edge-to-edge device, but set 15mm in from each side; the resulting reduction in the keybed area dictates a smaller key size.

On the other hand, the trackpad is responsive without being too sensitive while the rocker-type mouse button has a reassuring click when used and – a nice touch this – all the activity indicators built in.

The 10.2in widescreen is on the dark side, even with the brightness set to maximum, but it's perfectly adequate for surfing the web or checking email, which, after all, is what these devices are designed to do.

The 4213 does have one trick up its sleeve, in the form of HSPDA support; the Sim card slot is housed behind the 3,600mAh battery. Handily, the 3G modem isn't tied to one particular vendor, so you're free to shop around for the best deal. There's a whopping great 160GB drive for storage and hidden at the bottom of the left-hand side of the chassis is an SD card reader that supports SDHC.

Asus Eee PC S101

As befits the company that started the whole netbook craze off, Asus has moved the goalposts with the latest member of the Eee PC clan, the S10, a netbook that's clearly aimed at creating a premium end to the market.

In terms of looks, the S101 has more in common with the Asus range of ultraportable notebooks than with its Eee PC siblings. Unfortunately, the slimline styling will be matched by the thinness of its purchasers' wallets and purses.

Opening the burnt-orange lid reveals a brushed aluminium wrist pad with a chrome rocker mouse button and a glossy black bezel. The keyboard stretches across the whole width of the chassis and, although the keys are on the small side they are well shaped and responsive, as is the trackpad. However, it exhibits the annoying trait of many netbook keyboards in placing the right-hand Shift key to the right of the up arrow key.

While the Eee PC S101 looks like a very neat ultraportable, under the skin it's very much a netbook, with an Intel Atom N270 1.6GHz processor, 1GB of DDR2 memory and Intel's 945GSE chipset. The 10.2in WSVGA LED backlit screen is very nice, with a native resolution of 1,024x600 pixels and an anti-glare coating.

Our review model was a Windows XP version, which comes with a 16GB SSD (solid-state drive); the Linux version comes with a choice of a 32GB or 64GB SSD. Should you need extra storage, Asus bundles a 16GB SDHC card in the box.

Dell Inspiron Mini 9

Dell's Inspiron Mini 9 may well be the most eagerly anticipated netbook since Asus launched the original Eee PC. For the most part, the wait has been worth it.

The Mini 9's rounded styling seems to suit the netbook genre perfectly: it feels just right when you carry it around. Shunning the current Dell trend towards garish lid colours and special artist editions, the Mini 9 is currently available only in black, albeit the familiar, fingerprint-attracting glossy piano black that everyone seems to use these days.

The 8.9in WSVGA screen has a native resolution of 1,024x600 pixels and, despite its glossy finish, it isn't as bad in bright light conditions as some of the panels you find on much larger notebooks. Built into the top bezel is a 1.3-megapixel webcam.

Despite the compactness of its footprint, the Mini 9 manages to make the keyboard attractive. Roughly the same size as that of the Asus' 701, it has easier-to-use keys even for those with large fingers. The only quibble is the layout, but you soon get used to it.

The Windows XP version we reviewed comes with a 16GB SSD drive. Battery life isn't bad, with the test model giving us just over two and a half hours for general work from a four-cell battery. But it's not a stand-out performance, and can't compare with the Asus 901, for example. It would be interesting to see how long a six-cell battery would keep it going if Dell ever offered one as an alternative.

Elonex Webbook

Elonex's Webbook is a no-frills netbook. While it doesn't offer the same performance as the others in this round-up – largely because it uses Via's C7-M 1.6GHz processor instead of the Intel Atom fitted in the other four – this kind of misses the point. For the jobs that netbooks were originally designed to do, such as web surfing and checking email, it performs without skipping a beat.

Backing up the processor is just 512MB of memory, which is another reason for the sluggish performance. On the positive side, the Webbook comes with an 80GB hard drive and its 10.2in screen with 1,024x600 resolution is sharp and bright, and held up by a decent set of hinges. The keyboard keys are on the small side, which makes typing quickly a little daunting, but they are responsive, as is the small trackpad and the pair of even smaller mouse buttons.

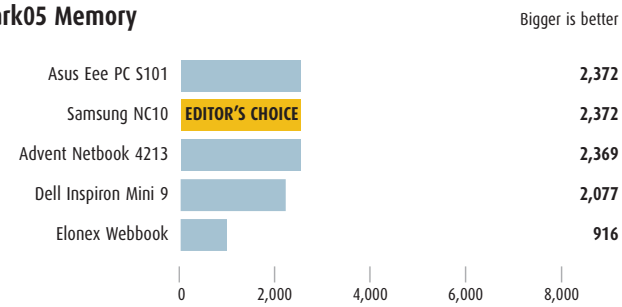
But the major disappointment with the Webbook is battery life. It uses a three-cell battery which under test conditions only lasted for only 63 minutes. That's very poor when you

Elonex Webbook

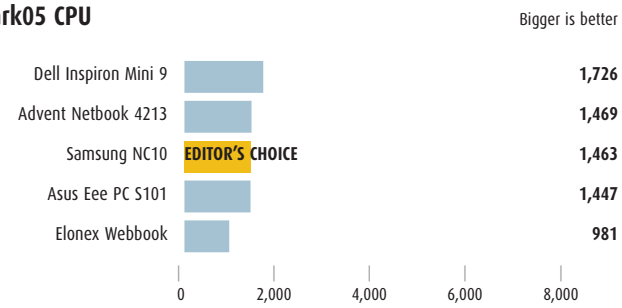
Lab results

The Samsung NC10's hard drive, Ram and CPU scores were in the same ball park as the leaders', but its battery life reader performance simply blew the rest away

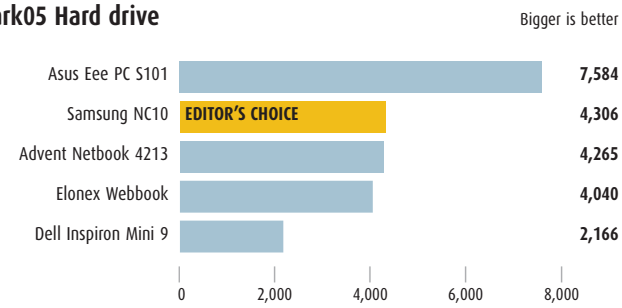
PCmark05 Memory



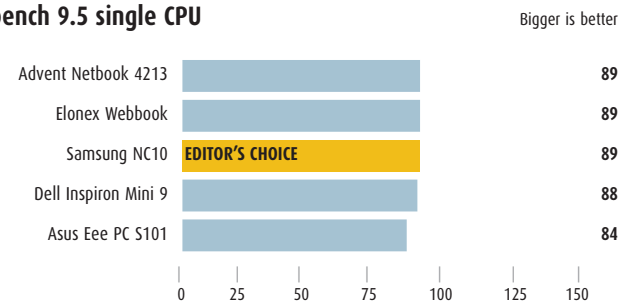
PCmark05 CPU



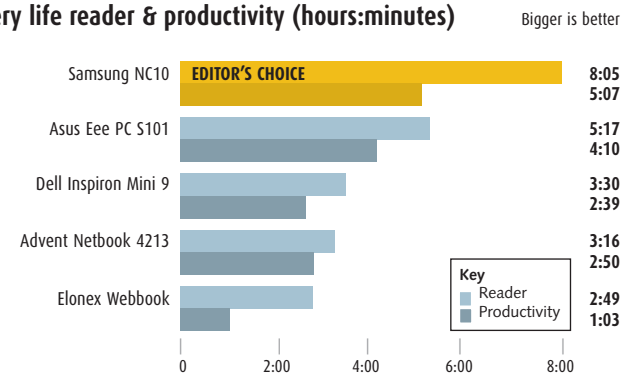
PCmark05 Hard drive



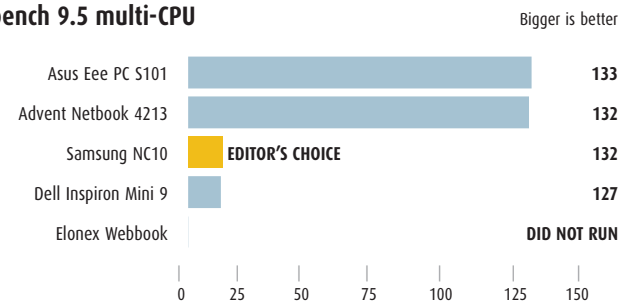
Cinebench 9.5 single CPU



Battery life reader & productivity (hours:minutes)



Cinebench 9.5 multi-CPU



compare it with MSI's Wind or the Asus 901: their six-cell batteries give four to five hours of life detached from the mains.

All the other usual netbook hardware is present: 802.11b/g Wifi (but no Bluetooth), 10/100 Ethernet, three USB ports and a VGA port. Built into the front of the Webbook's chassis is a card reader that supports SD, MMC and Memory Stick.

Samsung NC10

Samsung, like Dell, has come late to the netbook party and just like Dell's Mini 9, Samsung's NC10 shows just how carefully the manufacturer has been watching the breed evolve. The NC10 has a great keyboard, a 10.2in screen, a large 160GB hard drive and a high-capacity six-cell battery.

One thing that has divided opinion here is the NC10's finish. Some people love the matt look while others prefer the shiny finish of nearly all its rivals, but the big practical advantage of a matt finish is that it doesn't suffer from the scourge of fingerprints. On our example, the white finish (don't worry, Samsung does offer other colours) was relieved by a chrome metal strip running around the chassis edge.

The bane of many a netbook is the keyboard, but this is one thing that Samsung has got right – maybe a little too right, as the keyboard is so large it leaves very little space for the trackpad and rocker mouse button, which are tiny in comparison. But you can forgive the oversizing as the keybed shows very little, if any, flex and the near full-size keys are a joy to use. And just like most of Samsung's new notebooks, they come with Samsung's Silver Nano anti-bacterial coating to stop you picking up germs from your keyboard.

Samsung NC10

Battery life for the NC10 is as excellent as you would expect from a six-cell battery, with a running time of just over five hours when tested in normal use.

MANUFACTURER	ADVENT	ASUS	DELL	ELONEX	SAMSUNG
Model	Netbook 4213	Eee PC S101	Inspiron Mini 9	Webbook	NC10
Price	£349.99	£418.28	£299	£279.99	£299.99
Delivery charge (UK mainland)	Free	£5.86	Included in price	£9.95	Free
Sales line	0844 561 0000	No number	0844 444 5818	0161 868 0868	0844 561 0000
URL	www.pcworld.co.uk	www.dabs.com	www1.euro.dell.com	www.expansys.com	www.pcworld.co.uk
HARDWARE					
Processor	Intel Atom N270 (1.6GHz)	Intel Atom N270 (1.6GHz)	Intel Atom N270 (1.6GHz)	Via C7-M (1.6GHz)	Intel Atom N270 (1.6GHz)
Chipset	Intel i945GME/ICH7-MU	Intel i945GME/ICH7-MU	Intel i945GME/ICH7-MU	Via CX700	Intel i945GME/ICH7-MU
Ram	1GB PC2-5300 (333MHz) DDR2	1GB PC2-5300 (333MHz) DDR2	1GB PC2-5300 (333MHz) DDR2	512MB PC2-5300 (333MHz) DDR2	1GB PC2-5300 (333MHz) DDR2
Occupied/spare memory slots	1/0	1/0	1/0	1/1	1/0
Hard disk manufacturer and model	Western Digital WD1600BEVT	Asus JM S41 SSD	STEC SSD	Western Digital WD800BEVS-22RST0	Toshisba MK1652GSX
Hard disk size and speed	160GB/5,400rpm	16GB/None SSD	16GB/None SSD	80GB/5,400rpm	160GB/5,400rpm
No of Express Card/PC Card slots	0/0	0/0	0/0	0/0	0/0
No of USB/Firewire ports	3/0	3/0	3/0	3/0	3/0
MULTIMEDIA					
Graphics processor	Intel GMA950	Intel GMA950	Intel GMA950	Via/S3G Unichrome Pro II IGP	Intel GMA950
Graphics processor memory	Up to 128MB shared system memory	Up to 128MB shared system memory	Up to 128MB shared system memory	64MB shared system memory	Up to 128MB shared system memory
Screen size and native resolution	10.2in WSVGA/1,024x600	10.2in WSVGA/1,024x600	8.9in/1,024x600	10in WXGA/1,024x600	10.2in WSVGA/1,024x600
Video outputs	VGA	VGA	VGA	VGA	VGA
Soundchip	Realtek HD	Realtek HD	Realtek HD	Realtek HD	Realtek HD
Speaker setup	Stereo	Stereo	Stereo	Stereo	Stereo
OTHER INFORMATION					
Additional hardware	4-in-1 card reader, HSDPA card slot, 0.3-megapixel webcam, 10/100 Ethernet	4-in-1 card reader, 0.3-megapixel webcam, 10/100 Ethernet	3-in-1 card reader, 1.3-megapixel webcam	3-in-1 card reader, 10/100 Ethernet	3-in-1 card reader, 1.3-megapixel webcam, 10/100 Ethernet
Wireless networking	802.11b/g, Bluetooth 2.0	802.11n, Bluetooth 2.0	802.11g, Bluetooth 2.0	802.11b/g	802.11b/g, Bluetooth 2.0
Battery capacity (milliamp hours)	3,600mAh	4,900mAh	2,200mAh	2,900mAh	5,200mAh
Dimensions in mm (wxdxh)	257x180x39	264x180x18/25	232x172x27.2/31.7	252x183x31	261x185x30
Weight inc power adapter (kg)	1.73	1.35	1.22	1.8	1.70
Operating system	Windows XP Home SP3	Windows XP Home SP3	Windows XP Home SP3	Windows XP Home SP3	Windows XP Home SP3
Included retail software	Microsoft Works 9, Cyberlink Youcam	Adobe Acrobat 9, Microsoft Works 9	Microsoft Works 9	None	Adobe Acrobat
Standard warranty*	1yr RTB	2yr C&R	1yr C&R	1yr RTB	1yr International C&R
SCORES					
Features	★★★★☆	★★★★☆	★★★★☆	★★★☆☆	★★★½☆
Performance	★★★☆☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆
Value for money	★★★☆☆	★★★½☆	★★★★☆	★★★☆☆	★★★★☆
OVERALL	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★★☆

* RTB = return to base, C&R = collect and return

Editor's Choice

Editor's Choice Samsung NC10

Samsung NC10

Choosing a netbook is even more about personal choice than it is with a notebook. Do you remain faithful to the original concept and look for something with an 8.9in screen, for example, or follow the current trend for 10in screens? But what really matters is that a netbook is portable and cheap, with good battery life.

The Asus S101 isn't cheap, but its stylish slimline design certainly impresses. At first glance, it looks like an utraportable notebook, but under this enticing skin it is still just a netbook, albeit a very good one.

Dell's first foray into the market, the Mini 9, is a well-made, highly portable netbook with a reasonable keyboard considering how small the device is. And if you buy one through Vodafone you get the added attraction of integrated mobile broadband. But the Mini 9 does need a better battery to compete with the likes of the Asus 901 and Samsung's NC10.

For the combination of a great keyboard, a good screen, long battery life and an excellent price, it's hard to look any further than Samsung's NC10, which is why it wins our Editor's Choice award. **PCW**

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BUSINESS

TAKING DEFENSIVE ACTION

Notebook computers, USB keys and optical discs make it easy to carry data around. They're also easily lost or stolen. In this month's business section, we look at what you can do to minimise the risks and how to prevent data that has been lost from falling into the wrong hands. We also take a look at some of the latest business products, starting with the fastest laser printer Dell has ever produced, followed by a new release of an old stalwart, Netop Remote Control. Benq, meanwhile, has a new projector designed expressly for use in small rooms, which we check out along with Primera's Disc Publisher Pro, a device that will appeal to anyone interested in custom CD or DVD publishing. We also take a look at what the latest version of VMware Workstation has to offer and why it's so popular with developers and other software professionals.

On 1 December 2008, the standard rate of Vat was reduced to 15 per cent. Please note that some quoted prices in reviews may include or assume Vat at the old rate of 17.5 per cent.

CONTENTS

FEATURE

108 Safeguard your data to prevent it falling into the wrong hands

REVIEWS

110 Dell 5330dn Laser Printer
111 Netop Remote Control 9.2
112 Benq MP522ST
115 Primera Technology Disc Publisher
116 VMware Workstation 6.5

OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.
Recommended: A product that combines great features, usability and value for money.
Great Value: Not the best in class, but a product that has superior features and performance for the price.

Editor's Choice Business

Recommended Business

Great Value Business

The business awards are used for products that are more suited to home offices or small businesses.

'Dell has opted for a somewhat austere colour scheme, with the 5330dn best described as a large black cube'

Read the review on page 110

Keep your data safe

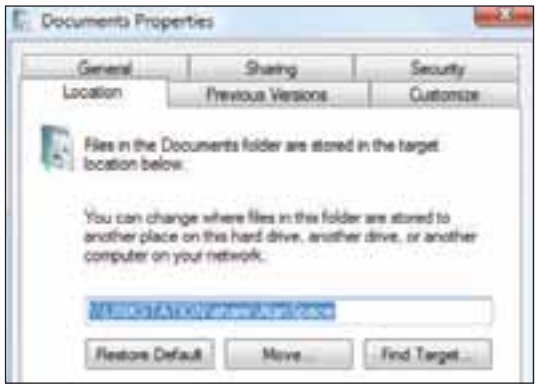
Notebook containing sensitive files left on train! Bank records go missing!

We've all seen the headlines and read the news stories about data loss at government departments and big companies, but it can happen to anyone. In this month's business section feature, we discuss what small businesses can do to prevent sensitive data from falling into the wrong hands.

Prevention, not cure

Safeguarding data doesn't have to be difficult. There are plenty of simple precautions you can take, such as making sure users store their files on shared network storage, for instance, rather than their local hard disk, especially on notebooks that are likely to be taken out of the office.

That means installing a file server or Network Attached Storage appliance if you don't already have one. It also means either encouraging users to store files on those servers or configuring their desktops so they can't do anything else, typically by redirecting their My Documents folder (just Documents on Vista) to a network share – a simple option in both Windows XP and Vista.



You can easily redirect the My Documents folder to a network drive rather than the local hard disk

Of course, files can still be copied to removable storage using a CD writer, for example, or by plugging in a USB memory stick or Flash memory card, so you also need to take steps to prevent that from happening. A written policy detailing when such devices can be used is a good start, specifying the level of authorisation required to copy different types of data and whether the files involved need to be encrypted.

If you wanted to be really strict, you could ban the use of removable storage altogether and remove things such as CD writers and floppy drives from all your PCs and notebooks. However, that's not always possible and it doesn't stop USB devices being plugged in, so you can also use software to manage these and other removable storage devices.

Several such products are available, such as Desktop Authority from Scriptlogic (**www.scriptlogic.com**), for example, or Devicelock (**www.devicelock.com**), which we reviewed in the December 2007 issue. These and similar management tools can be used to lock down access to USB and other local devices, but they're not cheap and far from foolproof. There's also the administrative overhead to consider, so think carefully before going down this route and look at alternatives first.

Data encryption

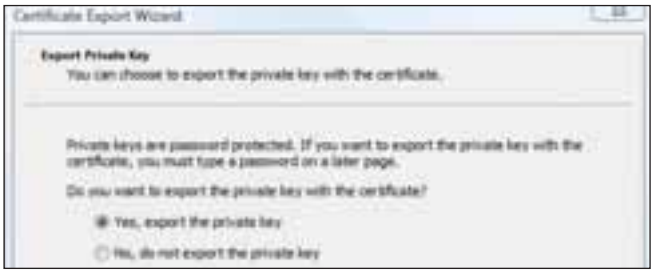
Ultimately, the best way to protect data on any kind of storage is to encrypt it; in effect, scrambling the data using a secret key, such that it can only be unscrambled and read by someone in possession of that key. The technology involved is admittedly complex, with many different mathematical algorithms on removable media, such as a CD or USB stick rather than the hard disk, as it's the disk contents you want to protect. Once done, you should also lock it away somewhere secure.

How to back up EFS keys

There's no need to explicitly create encryption keys for use with the Windows Encrypting File System (EFS) as they're generated automatically. However, it's a good idea to take a backup in case the files involved get deleted or damaged – here's how.

Start Internet Explorer, then select Internet Options from the Tools menu. Click on the Content tab, then the button marked Certificates and scroll through the list of personal certificates displayed until you find the one that has the Encrypting File System as its intended purpose. It's this certificate you need to back up, so click the Export button to start the Certificate Export wizard.

Click Next and choose the option marked 'Yes, export the private key'. You'll then be prompted for a password to protect the key and asked where to store the file created. It's a good idea to store the file



Use the Certificate Export wizard in Internet Explorer to back up the keys used by EFS to encrypt data

To protect data on its USB stick, McAfee offers both built-in data encryption and a fingerprint reader

that can be used to encrypt your computer files, offering varying levels of protection. However, for the most part you don't really need to know how it works, just what to use and how to employ it.

Some applications, such as Microsoft Word, have built-in encryption facilities that can be used to protect individual documents, but a better approach is to make use of the Encrypting File System (EFS) included in the Windows XP and Vista operating systems. The technology involved takes a few minutes to get working (see box, below right), but EFS can be used to protect any kind of file or document and offers a high level of security should a notebook or PC be stolen or lost.

On the downside, EFS can only protect files stored in folders on the local hard disk expressly designated for the purpose. It can't, for example, be used to routinely encrypt everything on the disk, or files copied to removable storage devices, although there are alternatives that can.

Another much talked about solution, again built into Windows, is Bitlocker, which can encrypt the contents of entire volumes. However, Bitlocker is only available to users of Vista Ultimate and Enterprise and, for the best results, requires a host PC with a so-called TPM (Trusted Platform Module) chip and compatible Bios. Those are pretty big hurdles to clear, so for most small businesses, it's a matter of looking around for other solutions to fill the void.

The right choice

There are a couple of alternatives here, one of which is to look for removable storage devices with encryption built in. The other is to go for general-purpose encryption software.

On the hardware front, USB sticks are available with encryption and, optionally, local authentication technologies built in. Ironkey (**www.ironkey.com**) is a popular brand, along with McAfee, whose Encrypted USB devices (formerly Safeboot USB) we looked at in the March 2008 issue. These devices are a little more expensive than an ordinary USB stick, but use one of these to transport data and encryption becomes something of a no-brainer. That's because anything copied to the stick will be encrypted as a matter of course, rendering your data useless to anyone else should it be stolen or mislaid.

Similarly, a number of general-purpose encryption programs are available, some of which have to be paid for, while others are free. One of the most popular is Truecrypt (**www.truecrypt.org**), an open-source application that can be used to encrypt anything from individual files and folders to entire volumes, disks and removable USB storage devices.

Software such as Truecrypt takes a little more effort to set up and can get quite complicated. However, once configured, it can take a lot of the pain out of encrypting data, such that anything copied or saved to particular folders, volumes or devices will be routinely encrypted with no questions asked.

On the downside, you need to record the passwords and keys you use and possibly take backups (see box, How to back up EFS keys), but that's a small price to pay to protect your data and keep your company out of the headlines. **PCW**

Open-source Truecrypt can be used to encrypt complete volumes and USB storage devices

Encrypting Windows files and folders

The Windows Encrypting File System (EFS) can be used to protect individual files or complete folders. Folders are best, however, as any files created or saved in an EFS folder will be encrypted automatically, making it harder to accidentally save a document in a readable format.

There's no extra software to install, but EFS can only be used on a PC where you log on using a username and password. Moreover, because those credentials are used to create the encryption keys, the stronger the password, the better.

Any folder can be encrypted, but you may want to encrypt the entire My Documents folder and any sub-folders and documents within it. The process is the same, regardless of the folder concerned.

Right-click the folder you want to protect and click Properties. Make sure you're looking at the General tab, then click the Advanced button to get to the window shown below, from which you simply tick the option marked 'Encrypt contents to secure data to turn encryption on'.

You can't encrypt a folder if it's compressed, and when you're protecting a folder, you'll be asked if you just want to apply the changes to a folder or sub-contents and existing files within it.

To turn encryption off again, go through the same procedure but untick the box marked 'Encrypt contents to secure data'. This can only be done by the user who turned it on in the first place. Other users will still be able to see the files held in an EFS folder; however, 'access denied' messages will be displayed when they try to open them.

Finally, encrypted files can be copied and moved as normal, but are automatically decrypted if copied to removable media, such as a CD or memory stick. Likewise, files are decrypted if copied to a network share or sent to other users by email.

Encrypt files and folders on a local hard disk

MONO LASER PRINTER

Dell 5330dn Laser Printer

This laser is faster than a speeding bullet – well, almost

Inside the sombre black exterior of the 5330dn lurks a fast and very capable network laser

The 5330dn is Dell's fastest ever laser printer. Monochrome only, it's capable of churning out up to 48 A4 pages per minute with an equally mind-boggling maximum duty cycle of 250,000 pages per month. A duplexer and Gigabit networking come as standard too, with add-on paper handling and other extras, if needed, to turn the 5330dn into a real small-business workhorse.

Dell has opted for a somewhat austere colour scheme for its printers, with the 5330dn best described as a large black cube. That said, it wouldn't look out of place in a trendy open-plan office or shop. It's also surprisingly compact, not much bigger than many much slower products, with a small monochrome LCD and keypad being the only local controls, which are easily accessible at the front.

Round the back there's a USB2 interface, but most customers will be looking to network the 5330dn, for which there's a Gigabit Ethernet port plus an optional wireless adapter (£69 ex Vat). Support for all the usual Windows, Mac and Linux printing protocols is built in, allowing the 5330dn to be shared on mixed platform networks, and there's the usual web-based interface for easy remote management and SNMP support for those with suitable consoles.

A 500-sheet A4 paper drawer is built in, with a 100-sheet multi-purpose feeder that folds out at the front when needed. Up to two more 500-sheet drawers can be added underneath (£169 ex Vat each), or there's a 2,100-sheet high-capacity feeder (£399 ex Vat) that can be used instead of one of the drawers, bringing overall capacity to 3,100 sheets, with a 600-sheet output expander (£169 ex Vat) being yet another additional option.

The only consumable required for day-to-day operation is toner, delivered via a conventional single cartridge containing both toner and replacement optical components. The standard cartridge shipped with the printer is rated for 10,000 pages and costs £70 ex Vat to replace. However, canny customers will soon realise it's better to go for the more economical high-yield cartridge, which can deliver twice as many prints for just £94 ex Vat (effectively 0.47p per page).

A 500MHz processor drives the beast, supported by 256MB of memory to which a further 512MB can be added if printing complex documents. Postscript and PCL emulations are provided as a matter of course, along with Windows drivers for both, plus additional monitoring and management software, including a tool to order replacement toner online.

There are no surprises with the 5330dn; it simply gets on with the job of printing. Silent when not being used, it takes around 45 seconds to warm up from standby, but once awake the first page of any job appears in just a few seconds. It is quite noisy when printing – not overly so, but you wouldn't want to be sitting next to it.

Print quality is more than adequate, with a maximum resolution of 600dpi and built-in enhancement technology to make your documents look even better. Text reproduction is excellent and it's even quite good at proofing photographs, although, of course, only in black and white.

Speed is the main selling point of the 5330dn, and it is very, very quick. Add in low running costs and that massive duty cycle and you have a heavyweight network printer at a lightweight small-business price.

Alan Stevens

Verdict

Pros Up to 48 pages per minute; integrated duplexer; Gigabit Ethernet; high-yield toner; lots of paper-handling options

Cons Noisy when printing

Overall A well-specified and well-engineered network laser that's fast enough for virtually any small-business task

Features	★★★★☆
Performance	★★★★★
Value for money	★★★★☆
Overall	★★★★☆

Price £645.08 (£549 ex Vat)

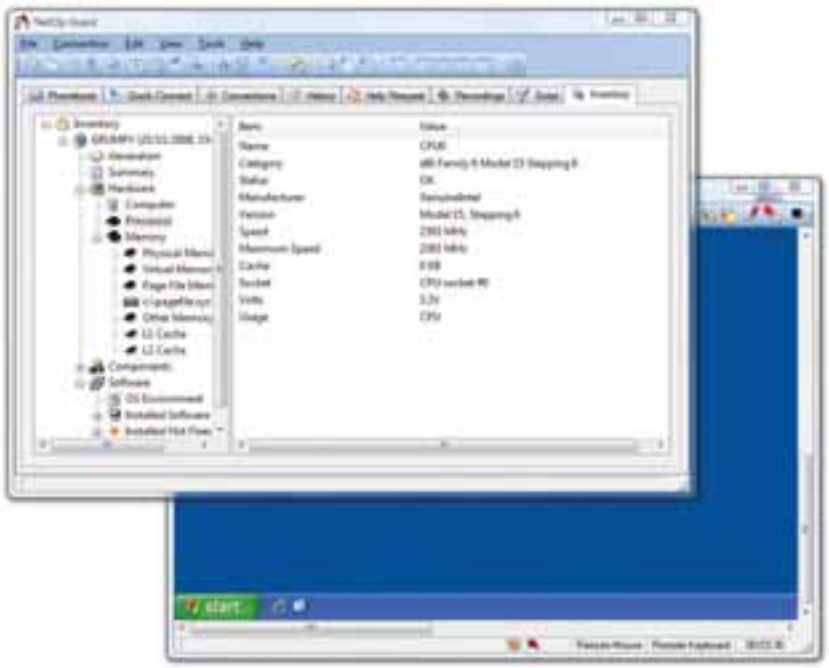
Contact Dell 0844 444 4155 www.dell.com

Specifications 48ppm A4 mono laser (50ppm US letter) • 600dpi • 256MB Ram • 500-sheet A4 paper drawer • 100-sheet multi-purpose tray • Integrated duplexer • USB2 and Gigabit Ethernet interfaces • Integrated network print server

REMOTE CONTROL

Netop Remote Control 9.2

Cross-platform remote control and a whole lot more



Netop Remote Control features wide platform and protocol support, plus inventory and a number of other useful remote management tools

Netop Remote Control is a mature and very capable program that can be used to control a variety of platforms from Windows through to Linux, Mac and even ancient Dos and OS/2 systems. Mobile and embedded devices can be supported using an add-in module, and the package goes well beyond basic remote control with tools to take inventories, transfer files, record and play back sessions and more.

The first thing to get to grips with is the terminology. Netop guests connect to Netop hosts and remotely control the host system, with a guest able to manage multiple hosts. A separate licensed install is required for each, with a separate 'Pack n' Deploy' utility available to distribute the software centrally. An on-demand version of the host is also available.

We installed the Netop guest onto a Windows Vista PC – the latest 9.2 release supporting 32-bit and 64-bit implementations of all Windows platforms. We then loaded the host onto a couple of Windows XP and Linux virtual machines (VMs); Netop supports servers, including Windows Server 2008. The latest version provides support for Intel vPro to remotely power-cycle and edit Bios settings on PCs that have this technology.

Backward-compatibility with older versions means there's a lot in the Netop package, including support for multiple networking protocols, infrared connections, dial-up modems and other pre-broadband technologies. For most deployments, however, setup is a simple matter of selecting a suitable communications profile and leaving the software to sort it out.

We mostly tested over a Lan, which resulted in excellent performance, but we also got good results using broadband, the 9.2 release adding a new HTTP transport to significantly boost transfer rates.

The user interface can take a little getting used to, but the main guest console is reasonably easy to follow, with tools to organise and manage connections, edit communication profiles, take recordings and so on. By default, you need to discover hosts to be controlled manually and make sure intervening firewalls are correctly configured. There are servers available to get around this and manage connections centrally, although these will bump up the price.

Connect to a host and a separate remote control window is opened. This shows the remote desktop with a long bar of icons at the top, giving quick access to a whole mass of tools. It took a while to find out what each of these did; some working directly, others linking you back to the main console. A guest user can, for example, chat with one or more remote host operators with an audio-visual chat option if webcams are available. You can also highlight things on the screen – useful when showing users how to do things – as well as blank the screen and lock the remote keyboard and mouse.

Another useful option is the ability to give demonstrations with the guest desktop mirrored live to multiple hosts. Files can also be transferred back and forth between guests and hosts, inventories started and hosts configured to request help directly from a guest user should they need it.

An impressive and comprehensive solution, Netop Remote Control does a lot more than some of the alternatives, but isn't cheap, especially if you have lots of hosts to manage. That's unlikely to be an issue if you're looking to equip a support team in a large organisation, but for smaller companies the alternatives may do all you want for a lot less. *Alan Stevens*

Verdict

Pros Multiplatform and protocol support; Intel vPro-enabled; remote chat and inventory tools; all traffic encrypted

Cons Expensive if you only need basic remote control

Overall A feature-rich remote control and management package, but an expensive buy for small businesses

Features	★★★★☆
Ease of use	★★★☆☆
Value for money	★★☆☆☆
Overall	★★★☆☆

Price From £168.03 (£143 ex Vat) – single guest and host licence

Contact Netop Tech UK 0845 466 9000 www.netop.com

System requirements Runs on all desktop and server versions of Windows – from 95 to Vista – and Windows Server 2008, plus Windows Mobile/CE, Linux, Solaris, Mac OSX, OS/2 and Dos

DIGITAL PROJECTOR

Benq MP522ST

Get up close and personal with this short-throw projector

This projector is ideal for use in small rooms

The trouble with most projectors is that they need to be a long way away from the screen in order to give a decent-size image. That's not usually a problem in a custom presentation suite or boardroom, but it's a real issue when it comes to ad-hoc presentations in cramped offices and meeting rooms where you need a 'short throw' projector, such as the MP522ST from Benq.

A number of techniques can be used to make a short-throw projector. In the case of the MP522T, it's a very prominent aspherical lens, enabling the Benq projector to project a 1.4m (55in – diagonal) image from a distance of just a metre. We used it both to give Powerpoint presentations and to watch DVD movies, and got a large and very clear picture at less than half that. We could also present from behind the projector, rather than standing in front, so there were no shadows and we weren't dazzled when presenting.

For our tests, we teamed the MP522ST with a Dell Vostro notebook and as both the devices have shiny black casings, this resulted in a very smart combination. We used the built-in 15-pin video interface to connect the two together, using the cable supplied, while other sources can be accommodated using either RCA or S-video jacks. At the rear is a connector for an integrated 5W speaker, along with a video-out port.

The MP522ST isn't the smallest projector on the market but is still fairly compact, with a protective cover for the lens and easy-to-use manual focusing ring. A dropdown foot at the front makes it easy to adjust the rake angle and there's a screw adjuster at the back to compensate for uneven surfaces, left to right.

The on/off button is on the top, together with buttons for the on-screen menu, and a small remote control is also provided. A quick-start menu takes you through the initial setup, including simple keystone correction to get a square picture. The projector adjusts most of the other settings itself to match the video source. The picture can be corrected for different coloured backgrounds, useful for when projecting onto bare walls. There's also a digital zoom facility, an on-screen presentation timer and optional beeper to help keep presenters on track.

Inside, the MP522ST uses the same Texas Instruments Digital Light Processor (DLP) chip as other Benq projectors. Here it's teamed with a 185W lamp rated at 2,000 Ansi Lumens, giving a very clear picture, without the need for blackout, at resolutions of up to 1,024x768 (XGA).

Lamp replacement requires a screwdriver and a new bulb will set you back around £135 ex Vat, although the bulb is rated for an impressive 4,000 hours, with built-in technology to keep its temperature within acceptable limits. The same technology will also prevent the projector powering up if too hot, a common cause of premature bulb failure, and keep the fan running when it's switched off. The fan is reasonably quiet, but the projector does emit a lot of hot air when in use, which could be an issue in a small room.

A final small niggle is the need to buy an optional carry case to protect the MP522ST when travelling, but other than that it's a very capable projector that is ideal for use in cramped small business offices and meeting rooms.

Alan Stevens

Verdict

Pros Three-year lamp guarantee and on-site replacement warranty; very quiet in operation; quick cooling; Texas Instruments DLP chip; easy to configure

Cons Generates a fair amount of heat; carry case optional

Overall A bright and affordable projector that gives good results even in cramped locations

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★★☆
Overall	★★★☆☆

Price £622.75 (£530 ex Vat)

Contact Benq www.benq.co.uk

Specifications XGA resolution (1,024x768) projector • 2,000 Ansi Lumens • 1,000:1 contrast ratio • 8-85Hz vertical scan rate • Texas Instruments DLP processor • 15-pin analogue video, RCA and S-video interfaces • Video out port • 5W speaker • Remote control • 26dB operation

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(CODE PC17)

CD/DVD PUBLISHING

Primera Technology Disc Publisher

The easy way to publish professional-looking optical discs in quantity

Disc Publisher Pro can burn CDs and DVDs in quantity, and print colour labels direct to disc

Burning the odd CD/DVD here or there is a relatively trivial task, but if you need to publish optical discs in quantity, it can become a time-consuming chore. Disc Publisher Pro from Primera Technology takes much of the hard work out of the process and can also print labels directly onto the media to give professional-looking, high-quality results.

Able to produce up to 500 discs per day, the Disc Publisher Pro is about the size of a large desktop printer, with a clear hinged plastic cover to keep out dust and messy fingers. Inside are two Pioneer CD/DVD burners, plus a 4800dpi colour inkjet printer, based on Lexmark technology and designed specifically to print disc labels. There are two removable plastic carriers – one for new unwritten discs and the other to hold the finished product – with a robotic arm to move discs around.

A USB2 interface connects the Disc Publisher Pro to a host PC, and a driver for use with Windows XP or Vista is supplied along with two software utilities. The principle disk-creation and copying program is PT Publisher, accompanied by a program called Surething, which is used to design disc labels.

Graphics created in Photoshop, Coredraw and other applications can also be printed, while Mac users get their own separate software to generate labels and drive the Primera product.

Installation took around half an hour, after which we found the product easy to use. Clear step-by-step wizards guide you through the processes involved, and you can either design your labels in advance or during the creation/copying procedure.

Following the manual provided, we were able to start copying existing CDs and DVDs in minutes. There's support for most formats, with PT Publisher copying the original to a temporary file on the hard disk before burning copies. Similarly, it didn't take long before we were burning discs of our own, containing documents, software, video clips and other files.

The time taken depends on the amount of data involved and the speed of the media used – and it can be a slow process. You're also limited by the USB connection, although with dual drives, two discs can be burned at the same time, and once you've kicked a job off, the machine can be left to get on with it rather than have to keep swapping discs in and out. Indeed, as delivered, you can load up to 50 blank discs at a time or, by installing the optional kiosk adapter provided, up to 100.

It's an amazing process to watch – the drive drawers opening and closing under software control, while the robotic arm picks and moves the discs around, as well as counting to make sure mistakes haven't occurred. Printing is fairly quick too, the end result of which is professional-looking labels incorporating photographs and fancy text – all in vivid, waterproof colour.

Inkjet printable discs are required, but these are readily available and the only other consumable is the ink with two easy-to-change cartridges (around £35 ex Vat each).

It's far from cheap, but it's important to understand that Disc Publisher Pro is certainly not a hobbyist tool. Rather, it's a robust, professional-quality device designed to appeal to a wide market, including small software houses, conference organisers, photographers, music publishers or, indeed, anyone looking to publish CD/DVDs in quantity. *Alan Stevens*

Verdict

Pros Dual drives; direct-to-disc colour label printer; bundled label design software; Windows and Mac support

Cons No Blu-ray support; USB connection limits speed

Overall A serious tool for any small business needing to publish professional-looking CDs or DVDs

Features	★★★☆☆
Ease of use	★★★☆☆
Value for money	★★★☆☆
Overall	★★★☆☆

Price £3,027.98 (£2,577 ex Vat)

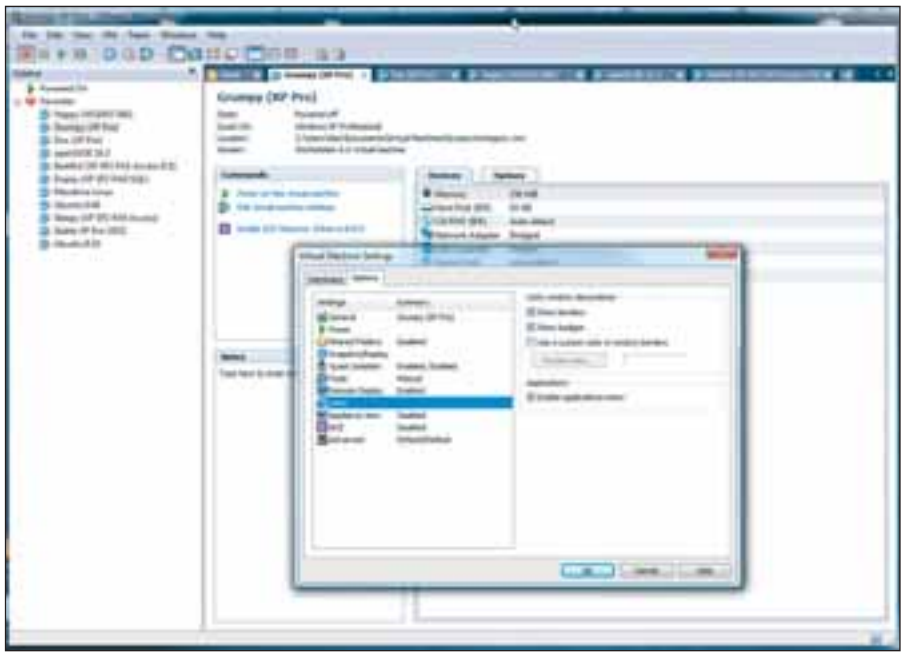
Contact Primera Technology Europe +49 (0) 611 927 770 www.primera-europe.eu

System requirements Dual Pioneer CD-R/DVD+-R optical disc drives • Media types – CD-R, CD-RW, DVD-R, DVD-Ram, DVD+R, Dual-Layer DVD+R • USB2 interface • 4,800x1,200dpi colour inkjet

VIRTUALISATION

VMware Workstation 6.5

Do virtually more with this updated VMware release



Unity mode in Workstation 6.5 allows applications in a virtual machine to be run from the host desktop

When we last looked at VMware Workstation (*PCW* August 2007 **www.pcw.co.uk/2192774**), we recommended it as an essential virtualisation tool for professional developers, system testers and support staff. The 6.5 update has even more to commend it. Together with performance and platform enhancements, there are a number of really useful new features.

VMware Workstation differs from most other virtualisation products because it has built-in network emulation and modelling facilities, together with session recording/replay and other debugging tools. You not only get to build and run virtual machines (VMs), but can also monitor their activity, take snapshots, re-run sessions and debug code running within them.

Available for both Windows and Linux PCs, VMware Workstation supports a huge number of guest operating systems – both 32-bit, with the right hardware, and 64-bit. That support is further enhanced in 6.5, mainly to cope with Windows Server 2008 and some of the more recently updated Linux distros. This version can now handle the Windows pre-installation and recovery environments and make use of DirectX 9 accelerated graphics in Windows XP guests.

Installation is straightforward even on Linux, where new graphical setup and editing tools replace features previously only manageable via the command line. New tools to help with creating and editing guest VMs are provided, although few changes have been made to the very intuitive management interface.

You still need a well-specified PC to get the most out of VMware Workstation, but a lot of work has gone into improving performance, particularly when dragging and dropping files between VMs. Virtual networking has been speeded up too, especially when using Network Address Translation (Nat), and support for virtual machine streaming added.

USB device support has been improved, drivers for some hot-swap hardware added and experimental support introduced to enable smart cards to be used inside VMs.

New features include a fully integrated set of authoring tools to turn VMs into distributable, self-contained VMware 'ACE' packages. You now also get Unity mode, whereby applications installed in a guest VM can be started and run from the host desktop.

Unity applications look and feel as if they're being run directly on the host PC but are, in effect, executed within the VM environment, the only indicator being colour-coded borders. This helps avoid compatibility issues and lets you continue to run older versions of applications without having to switch to the guest VM desktop. However, it's only fully supported on Windows, with limited Linux support at present.

A link state propagation feature enables VMs to refresh addresses when the host is moved to a new network, which is useful for wireless notebook users. The session record and replay tool loses its experimental tag and has the ability to insert markers, plus browse and replay a session from any point within a recording. Experimental support for replay debugging is also incorporated.

On the downside, the new features do add to the complexity of the package, but they're worth having – even the 'experimental' ones. For professionals wanting a serious virtualisation tool, they make VMware Workstation even harder to match. *Alan Stevens*

Verdict

Pros Unity mode; integrated ACE authoring; link state propagation; performance enhancements; support for Windows Server 2008 and other new guests

Cons Well-specified host required; some features still experimental

Overall Still the best virtualisation tool around for professional developers, testers and support staff, and now even better

Features	★★★★☆
Ease of use	★★★★☆
Value for money	★★★★★
Overall	★★★★☆

Price £160.79 (£136.84 ex Vat)

Contact VMware 01276 414 300 www.vmware.com

System requirements 32/64-bit x86 processor (733MHz or faster) • 512MB Ram (2GB or more recommended) • IDE/SCSI storage • 200MB (Linux), 650MB (Windows) free disk space plus 1GB (recommended minimum) per VM • 32/64-bit Windows or Linux host operating systems

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Andy 'the Punisher' Butterfield, Computacenter

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Jamie 'Gentlemen Jim' Stewart, CAE UK

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Steve 'Easy' Vaughan, Q-Associates

To register your interest email **nathalie.perez@incisivemedia.com** or phone 020 7316 9586.

EDITED BY WILL STAPLEY

HANDS ON

OVERCLOCKING MADE EASY

Being able to get a performance boost without spending any money is something few PC enthusiasts would turn their nose up at, but the subject of overclocking often strikes fear into the heart of many. In this month's Hardware, we show you exactly how to overclock your processor, what sort of results to expect and how to make sure it doesn't damage your PC's life expectancy.

There are, of course, other ways to speed up your computer, and switching from resource-hungry Vista to open-source Linux is becoming an ever-more popular option. With version 8.10 of Ubuntu now available, there has never been a better time to give it a go. Find out all about it in the Linux column.

Also this month, we look at memory cards in Digital Imaging, unravel the inner workings of the Datevalue function in Databases, and show you how to get a mobile version of your website up and running in seconds in Web Development.

CONTENTS

120 QUESTION TIME
JPEG Recovery, Outlook as a default client, getting Excel to display currency with 'k' and 'm', and much more. Our experts have the answers

124 HARDWARE
Overclocking could help you get the most out of your computer's processor

125 PERFORMANCE
Windows is constantly checking and downloading updates, but they might not always be a good thing

128 WINDOWS
We look at how Winbubble will help you tweak Vista

138 LINUX/UNIX
The latest Ubuntu distro – Intrepid Ibex – lands

140 DIGITAL IMAGING & VIDEO
There are a few things to remember when selecting a memory card for your digital camera

142 WORD PROCESSING
Discover how bookmarks can make navigating your documents much easier

144 SPREADSHEETS
A few gems in Excel you might not know or have long forgotten

146 WEB DEVELOPMENT
Mobile web access has finally become a viable technology for those on the move

148 NETWORKS
Keeping a public network locked down and safe doesn't have to mean having eyes in the back of your head

150 DATABASES
Using the Datevalue function to solve migration issues

152 VISUAL PROGRAMMING
Is there any benefit to cloud computing? We bring you the pros and cons

26 PAGES OF...

- ADVICE
- TOP TIPS
- TECHNIQUES
- WORKSHOPS
- HARDWARE SOLUTIONS
- SOFTWARE SOLUTIONS
- Q&A

Far left: Lexar's implementation of UDMA has increased data transfer speeds (see page 140)

Left: Find out how you can translate Roman dates (see page 144)

Advice from our experts

PCW's experts solve your problems

DIGITAL IMAGING

Q My friend's daughter accidentally deleted a load of family photos from their PC. I managed to salvage them using a data recovery program, but quite a lot of them cannot be accessed and seem to be corrupted. The files appear to be their original size and I'm hoping it's only the wrapper that's damaged, but do you know of anything that will attempt to repair them? Ideally free, but I'm sure he won't mind paying if he knows it'll repair most of them.
Matthew Finch

A JPEG Recovery might be able to restore the corrupt files. It costs $44.95 (approx £30), but there's a 15-day free trial download at **www.hketech.com/JPEG-recovery**.

If that doesn't work, it won't have cost you anything; if it does, next time your friend's daughter plays fast and loose with the Delete key, you can dock the cost of the software from her pocket money. Watch out for next month's Hands On Digital Imaging column, which takes a practical look at recovering lost and damaged photos.

Q I'm planning to take my digital camera on a US trip that involves several short-haul flights and I won't have the opportunity to download the photos from memory cards (SD) until I return home. The cards and my camera will be in my hand luggage and I'm worried that the airport security scanners will damage or wipe my images. Should I be?
Terry Bond

A Unlike film emulsions, Flash memory cards can be put through airport security scanners with no ill effects – your photos will be quite safe. In 2004, the International Imaging Association (**www.i3a.org**), card manufacturer Sandisk and the US Transportation Security Administration carried out tests that concluded "digital cameras and their image storage media can travel safely in either checked or carry-on bags".

SD cards won't be harmed by security scanners at airports

HARDWARE

Q I reside in California and have been given an MSI Wind notebook as a gift. I'm being seconded to Ireland for a year and wondered what I'd need to do regarding power supplies and the notebook? Will I need a step-down converter?
Robert Redmond

'JPEG Recovery might be able to restore the corrupt files'

A Recognising they could be used around the world, most laptop power supplies (along with digital camera or camcorder chargers) can adapt to voltages between 100v and 240v, along with AC frequencies of 50Hz and 60Hz. To confirm this, simply have a look at the writing on the back of the charger or AC adapter. If it says it can handle input voltages of 100-240v at 50/60Hz, then it'll work just fine in Ireland. A UK model with the same spec supply will also work in the US, so there is no need for a step-down converter.

The only difference is the shape of the AC plug and socket. You could either use your existing US power lead with a European travel adapter to fit the destination wall socket, or if your adapter has a removable lead, buy a local one to replace it. Enjoy your stay in Ireland!

Q I have an old laptop and some equally old MS-Dos/Fortran programs that I would like to run. Would it be feasible to format the hard disk, install MS-Dos and then the Fortran programs, or would I be wasting my time even to try? I assume the command-line prompt in XP and Vista will not give access to a full implementation of MS-Dos.
Howard G Allen

A Some MS-Dos programs will happily run under the Command Prompt in older versions of Windows, but others won't. So if your old laptop already runs Windows, we'd recommend trying it first to save time. But whatever the outcome, you may prefer to pursue your suggestion of reformatting the drive and installing Dos on it. This should offer greater compatibility with the programs, along with booting faster and running without the overheads of

The MSI Wind is a happy traveller

Windows. Of course, you need to ensure your laptop meets the system requirements of the software you'd like to run.

Indeed, Dos or compact Linux installations are great operating systems for old laptops, as they'll run quickly and efficiently, while supporting a surprising variety of programs.

Q I recently bought a laptop running Vista, but need to run specialist software that only works under XP. Since I'd like to keep hold of Vista to get to know it better, is it possible to install XP on an external hard disk and boot from that when I need to run the software?
Alan W Owens

A Unfortunately, it's difficult to get Windows to boot from an external hard disk, especially if there's an existing internal one. Your best bet is to create a dual-boot configuration on your internal disk. This is easiest if the disk is split into two partitions – one for each operating system.

Presuming your disk currently has a single partition occupying its entire capacity, you'll either need to delete it, create two partitions and install both operating systems from scratch, or use a third-party utility to shrink your existing partition to make room for a second.

If starting from scratch, it's easiest to install XP first, followed by Vista (specifying the other partition for its location), as Vista will see XP and automatically set up a dual-boot option. If installing XP after Vista, though, XP will overwrite Vista's boot code and temporarily render it invisible. To reinstate this and present a dual-boot menu, you'll need to first insert the Vista DVD to 'repair' your previous installation, then use Easy BCD (from **http://neosmart.net/dl.php?id=1**) to create a new dual-boot menu.

SPREADSHEETS

Q With an Excel file that has a worksheet for each of the 12 months, I want to summarise the totals on a thirteenth sheet. The tabs are entitled Jan, Feb, etc. Each sheet's important total is in cell G19. At the moment I type in `=Jan!G19`, `=Feb!G19` and so on for each month on the summary sheet. Is there a shortcut for referring to each?
Corinne Linley

A If you enter Jan in cell A2 of the summary sheet and drag this down the column, Excel will complete the series to Dec. In cell B2, enter `=INDIRECT(A2&"!$G$19")`. Drag this formula down to cell B13.

A single formula for adding totals to a summary worksheet

SCREEN 1

=SUM(INDIRECT(A2&"!$G$19"))

Months	Sales
Jan	£ 198,765
Feb	£ 123,456
Mar	£ 188,765
Apr	£ 111,765
May	£ 190,765
Jun	£ 200,765
Jul	£ 199,995
Aug	£ 210,065
Sep	£ 129,765
Oct	£ 104,765
Nov	£ 122,334
Dec	£ 213,765
Total	£ 1,994,970

Cell B2 will display the total for January, B3 for February, and so on (see screen 1). The Indirect function provides you with the text within a cell so you can use it within a formula. As Jan is in cell A2, the given formula is the equivalent of Jan!G19.

Q I thought I could use the Rand function to generate letter combinations for passwords on demand but have quickly come to grief. I hoped I could convert randomly generated integer values between 10 and 35 for text characters A to Z. Is there a simple way of making Excel do this?
Dick Endecott

A Choose Arial as your font. In cell A1, enter `=RANDBETWEEN(65,90)` and drag down the column. In ↘

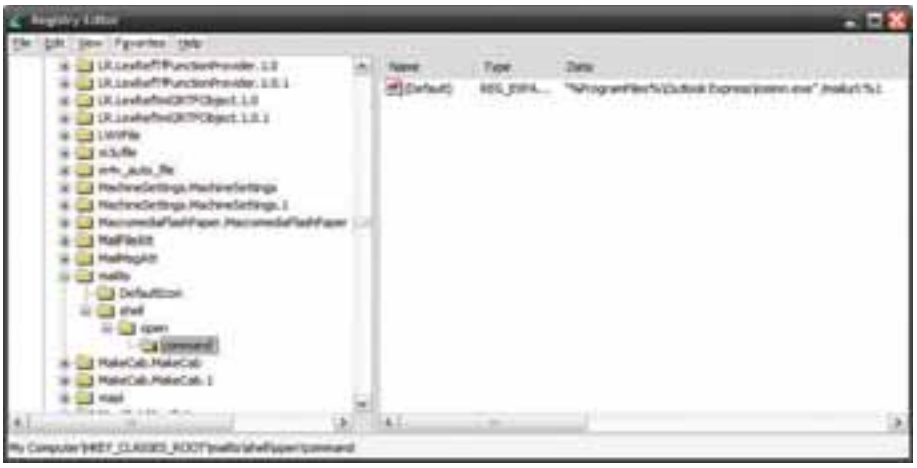
Make Outlook the default mail client

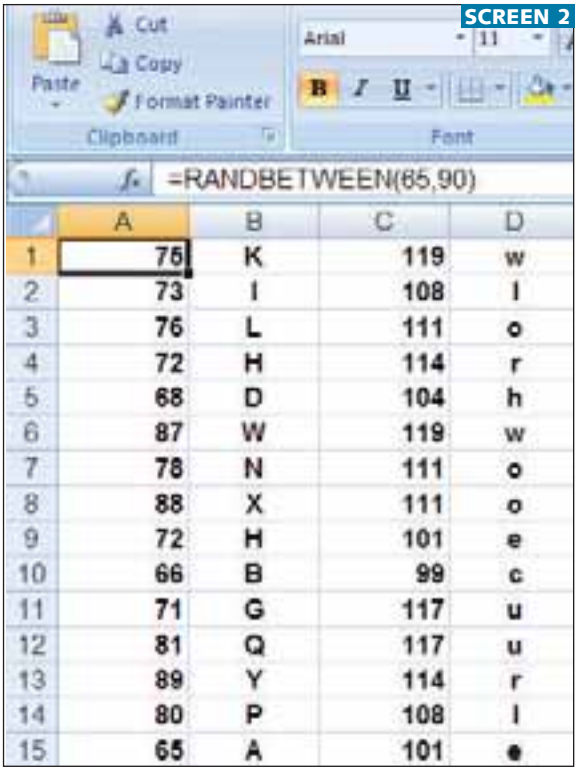
WINDOWS

Q I have Microsoft Office Enterprise 2007 installed on my home computer, which runs XP Professional. Office includes the full version of Outlook, but I still run Outlook Express for my emails. Recently, I've found that clicking on an email hyperlink opens an Outlook 2007 window rather than an Outlook Express email window. In IE Tools, Internet Options, Programs, Outlook Express is selected as the email program. How can I get hyperlinks to revert to opening a new Outlook Express email?
Richard East

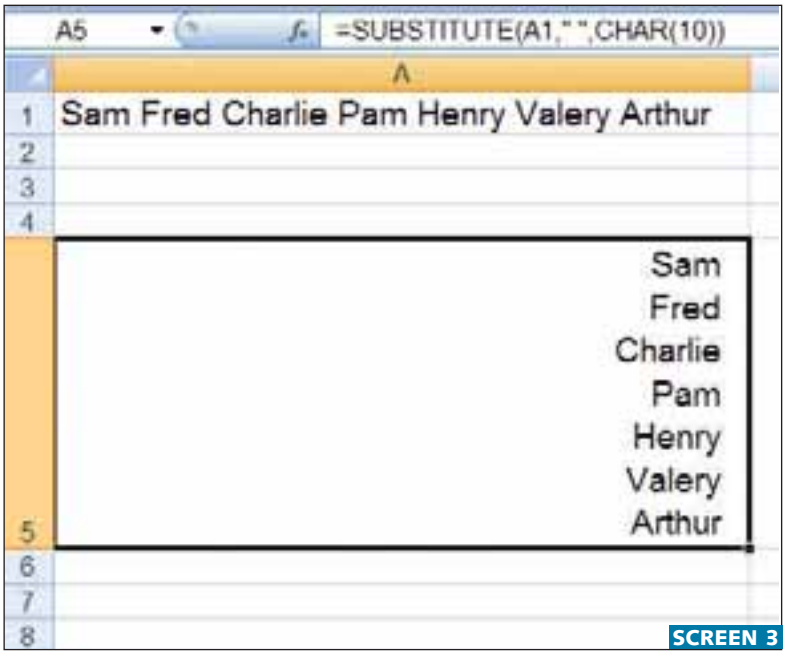
A Open Outlook and go to Tools, Options, Other. Untick 'Make Outlook the default program...', then OK out. Should you get a message saying, 'Outlook is not currently your default mail client…' then untick the 'Always perform this check' box, then click 'No'. Close Outlook and open Outlook Express. If you get a message saying 'Outlook Express is not your default...' reply 'Yes'. If you don't get the message, then go to Tools, Options, General and click the 'Make default' button. Close Outlook Express and test by going to Start, Run and typing 'mailto:' (with the colon but without the quotes). Outlook Express should then open with a new message window. If you still have problems, look in the Registry under HKEY_CLASSES_ROOT\mailto\shell\open\command. In the right-hand pane, Default should have a value of: "%ProgramFiles%\Outlook Express\msimn.exe" /mailurl:%1.

Checking the default mail client





Left: Displaying randomly selected letters for passwords



Above: A quick and easy way to word-wrap names in a cell

cell B1 enter `=CHAR(A1)` and drag down the column. This displays in column B the capitalised alphabet scrambled. For scrambled lower-case letters, substitute `=RANDBETWEEN(97,122)` (see screen 2). In earlier versions of Excel, this function is in the Analysis Toolpak. Lately it's included.

Q I have names in an Excel 2007 cell, each separated by a space. How can I keep them all in the same cell but word-wrap them so they are stacked vertically?
Damian Mazer

A If the names are in cell A1, in another cell enter
`=SUBSTITUTE(A1," " ↙ ",CHAR(10))`
(Key: ↙ code string continues)
Right-click in this cell, choose Format Cells, Alignment and check the Wrap text box. In most fonts, the SUBSTITUTE function will put unseen carriage returns where the spaces were (see screen 3).

Q In previous versions of Excel, it was simple to design a custom button for use on a toolbar to activate a macro. Am I right in thinking that this function has been dropped in Excel 2007?
John Howell

A I suspect the previous pixel-by-pixel icon editor probably seemed too old-fashioned for Excel 2007. After choosing the Insert button, either as a Form Control or Active X Control, the options for formatting the button appear limited.

'Office 2003 SP3 update blocked access to Word 1 and 2 documents'

You could create a Shape graphic and then choose to assign a macro to run from that. The Shape can use a photo or graphic design as fill. Alternatively, try Ico FX, which claims to be an icon editor for creating and editing icons for Windows XP and Vista. There is a free download at **www.mydigitallife.info**.

Q How can I get Excel to display currency with 'k' for thousands and 'm' for millions, rounded to one decimal, and anything less than a thousand pounds with two decimals?
Bill Parsons

A You can add conditional text with a Custom format. Right-click on the cell and choose Format Cells, Custom. Watching the commas and semi-colons carefully, enter in the Type box
`[>1000000]£#.0,,"m";[>1000]↙ £#.0,"k";£#,##0.00`
Enter 10000001 in such a formatted cell and it will display as £10.0m. An entry of 1234.56 will be shown as £1.2k and 98.76 will appear as £98.76. Once familiar with the composition of a Custom Number format, you can adjust it to suit your needs, with or without a currency symbol, or with or without decimal points.

Q Sometimes when I open an Excel file, it only fills a portion of my screen. Is it possible to make it always fill the screen when it starts?
Marjorie Spencer

A Right-click on the shortcut you used to open the file. Choose Properties, and under the Shortcut tab go to the 'Run:' box and choose Maximised.

WORD PROCESSING

Q In October's Question Time, you mentioned that if Cleartype is turned off in Windows display settings, this can be overridden for Word (and other Office 2007) programs. I can't find the option shown in the screenshot, and I can't find the global Cleartype options either. I'm using Vista Ultimate.
Mel Culross

A The Office-only option isn't available in Vista, only in XP, and the global setting takes some finding. If you go to Control

A varchar too much

DATABASES

Q In a conversation the other day about the text fields in a table in my Access database, the person I was taking to kept saying the word "var-char" whenever I said text, like I was wrong. Is text wrong?
Terminologically Worried (aka Mina Patel)

A Absolutely not. In the context of Access table design you are perfectly correct in referring to a field destined to hold character data as being of the 'text' data type. Text in this sense encompasses letters, punctuation symbols and numbers that are never used in mathematical operations, such as '2 Acacia Gardens'.

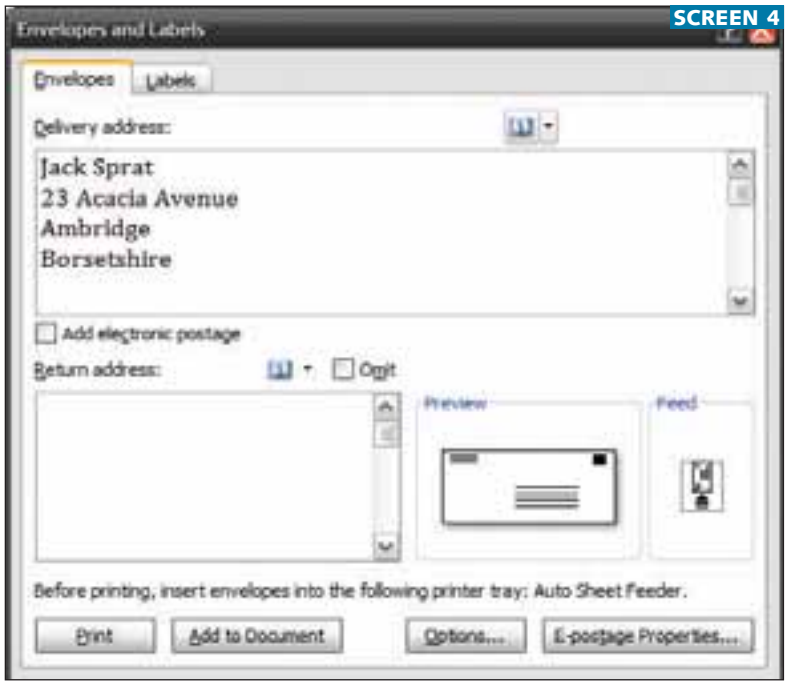
Your conversationalist was using a term used in RDBMSs, which is aimed at large-scale professional corporate use – products such as SQL Server, Oracle and DB2. While it is true that data which is best stored in an Access text field will probably be best suited to a varchar field in one of these RDBMSs, the use of the term during a discussion of Access is unhelpful, to say the least.

Varchar is a shortened form of 'variable character' field. In SQL Server, for instance, a column of the varchar type has a variable length which can be anything between 1 and 8,000 bytes. Each character takes up one byte. Also supported is the 'char' data type, which is of a fixed length between 1 and 8,000 bytes.

Panel, Personalisation, Windows Colour and Appearance, you'll see a link in blue to 'Open classic appearance properties...'. Clicking this opens Appearance Settings, and clicking the Effects button leads, at last, to the Cleartype options.

Q When installing Wordperfect X3 from CD, there is no option of drive offered – it defaults to C. As my C: drive is already bloated, I've been trying to discover from Corel how to change this, but I'm going around in circles. Can you please tell me if you've come across this particular problem yourself and how you dealt with it?
Dick Stuart-Grenville

A The option is there, but rather cleverly concealed. Start the installation, agree to the licence terms, enter your name, organisation and serial number, and you'll get a screen asking you which applications you'd like to install. At the bottom of this screen is an Advanced Options button – click it. This will take you to a screen letting you configure the programs and features you want in detail. Having done this, click Next, and you'll get a screen allowing you to change the destination drives and folders for the X3 programs and Wordperfect Mail. You also get the option to save 288MB of space by not copying the installation files from the CD to your hard disk.



Tracking down the Word 2007 address button

Q In Word XP, I could add the address to a letter by clicking on the Outlook address book icon on the toolbar and selecting the address from the Outlook contact. I cannot find this in Word 2007. Is the facility still available and hidden somewhere?
Roy Lardner

A The short answer is yes and yes. You'll find the button by going to the Mailings ribbon, then clicking on Envelope. You'll then get a similar dialogue to that previously found under Tools, Letters and Mailings, Envelopes and Labels, complete with the address book button (see screen 4).

Q We are using Word 2003 and trying to open some documents that were created in a previous version of the program. We're not quite sure which version but the files date from 1993. When we try to open these, a message appears stating, 'This file type is blocked from opening in this version by your Registry policy setting'. What's going on here and how can we open our old documents?
Joan and Peter Amhurst

A This sounds like the work of the Office 2003 SP3 update, which for reasons of 'security' blocked access to Word version 1 and 2 document files. Fortunately, this is reversible – Microsoft has issued Registry patches, which you'll find, with full instructions, at **http://support.microsoft.com/kb/938810**. **PCW**

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Sound sound@pcw.co.uk
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Visual programming visual@pcw.co.uk
Web development webdev@pcw.co.uk
Windows win@pcw.co.uk
Word processing wp@pcw.co.uk

Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

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The need for speed

How to squeeze every last drop out of your processor

Overclocking is a favourite pastime of PC hardware enthusiasts, including myself. However, most of us understand that overclocking isn't without risks. So, as I attempt my highest overclock to date in this month's column, I'll also be reporting on the less desirable side effects.

Overclocking rig

There are two types of overclocker: those who make modest increases that they believe are still well within the part's tolerances; and those that turn it into an extreme sport, pushing a component to the limits with exotic cooling hardware. I belong to the former camp. I'm happy to enjoy a small boost for free, but don't want to bother with anything other than conventional air cooling.

For this month's tests I used the same rig as last month, albeit with some Ram swapped out. So the test system consisted of an Intel QX9650 processor fitted into an Asus P5Q Deluxe motherboard with 2GB of Crucial DDR-2 800MHz memory and a Gigabyte NX66256DP graphics card. The system booted Windows Vista Ultimate 64-bit from a 500GB Samsung Serial ATA hard disk and was powered by a Corsair HX520W supply. Finally, a Zalman CNPS9700-NT Super Aero Flower kept processor temperatures under control with air cooling only, albeit with a fairly large 110mm fan.

As an Extreme model, the Intel QX9650 is one of the company's few processors that features an unlocked clock multiplier. As such it allows us to compare the effects of overclocking by increasing it or the external bus.

Test results

To test the speed of each configuration with a real-life benchmark, I timed how long it took for Windows Movie Maker to convert a 2.09GB DV AVI file into a 77.9MB WMV file using the VHS Quality preset. This is a processor-intensive operation that exploits all four cores of the QX9650.

Intel's QX9650 has an unlocked clock multiplier, which means you don't have to rely on boosting the external bus speed alone

The QX9650's official clock multiplier and external bus are 9x and 333MHz, respectively, resulting in a 3GHz clock speed under normal conditions. Here, the system encoded the file in 176 seconds.

Since the QX9650 allows its clock multiplier to be modified, I did that first as it would have no impact on the other components, such as memory. So I increased the multiplier from 9x to 10x, resulting in an overclocked speed of 3.33GHz. The system booted Windows without complaint, with the video encode taking 155 seconds – 21 seconds quicker.

Next the multiplier was increased to 11x, overclocking the processor to 3.66GHz. Again it booted without problems and shaved 14 seconds from the encode time, taking 141 seconds. This appeared to be too easy, but with the multiplier increased to 12x, the system wouldn't boot Windows, failing with a blue screen. I tried gradually increasing the core voltage by five, 10 and even 20 per cent, but to no avail. The Asus Bios offered an 11.5x setting, but it too failed, so I returned the multiplier to the standard nine-times and the core voltage to its default.

Next I tried increasing the external bus speed, which in the absence of an unlocked multiplier is the only way most people can overclock their system. High-end motherboards offer controls to adjust the memory speed independently, but I prefer to keep the memory and external bus operating at the same speed for the best performance. Besides, with DDR2 800MHz memory, I could run the external bus at up to 400MHz without pushing the Ram beyond its specification.

So with the clock multiplier set to the default 9x, I increased the bus from 333MHz to 366MHz, overclocking the processor to 3.3GHz and driving the memory at 732MHz rather than the previous 666MHz. The video encode took exactly the same 155 seconds as the previous

Overclocking processors generates greater heat. Zalman's CNPS9700-NT represents the pinnacle of air cooling before resorting to water cooling or refrigeration

CPU-Z showing the QX9650 overclocked by one-third to a massive 4GHz, using a 10x multiplier on a 400MHz bus and nothing more than air cooling

10x/333MHz configuration – 21 seconds quicker than normal.

I then increased the external bus to 400MHz, which overclocked the processor to 3.6GHz and drove the memory at its maximum 800MHz specification. It booted fine and performed the encode in 146 seconds – interestingly, a little slower than the earlier 11x/333MHz configuration.

Increasing the external bus further overclocked the memory, at which point the system wasn't totally happy, so I decided to stick with 400MHz and try it with a higher multiplier. With the bus at 400MHz and the multiplier increased to 10x, the processor was overclocked to 4GHz and booted Windows without issue (see screen 1). The encode was faster at 135 seconds, but only nine seconds quicker than the 9x/400MHz setting.

Sadly, that's as far as I could overclock my system with conventional air cooling. Boosting the multiplier to 11x for a 4.4GHz overclock failed to post, and dropping back to 10.5x and 4.2GHz may have posted, but failed to boot Windows.

Power consumption

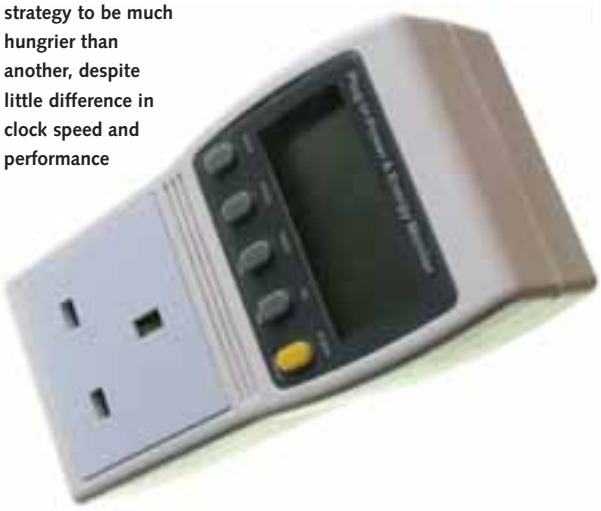
While overclocking my system, I kept a close eye on power consumption using a Maplin mains power meter. This revealed some interesting side effects that could change your long-term view on certain overclocking configurations. For consistency, I took a measurement at the same halfway mark on each video encode, when the load was at 85 per cent.

With the standard 9x/333MHz configuration, the system consumed 145W. This figure remained the same with the multiplier increased to 10x, but jumped slightly to 150W at 11x.

With the multiplier set back to 9x and the bus increased to 366MHz, the power consumption jumped to 155W. That's 10W more than the 10x/333MHz configuration, despite both having the same final clock speed and exactly the same encoding time.

With the multiplier at 9x/400MHz, the consumption leapt to 172W – that's 22W more than the 11x/333MHz configuration, despite both having similar final clock speeds, and the earlier one actually delivering a slightly quicker encode.

Finally, with the 10x/400MHz configuration, the consumption increased to 180W. That may be proportionately acceptable compared with the 145W starting point, given the 33 per cent boost in clock speed, but the surprising results were the differences in consumption when overclocking with the multiplier compared to the bus.



Measuring the mains power consumption revealed one overclocking strategy to be much hungrier than another, despite little difference in clock speed and performance

Multiplier magic

I'd expected the bus increases to yield the best results, given the memory was being driven quicker alongside an overclocked processor, but in this particular test increasing the multiplier alone delivered slightly better speeds. Of course, this is just one benchmark, and another that relies on memory bandwidth may tell a different story.

The really interesting result was the difference in power consumption. At 11x/333MHz for a 3.63GHz overclock, the encode took 141 seconds and consumed 150W at the 50 per cent mark. At 9x/400MHz for 3.6GHz overclock, the encode took five seconds longer, while consuming 22 more watts at the same point.

Clearly, overclocking the QX9650 by multiplier alone delivered the preferred result and, while that's little consolation for those with locked multipliers, it does prove it's worth performing additional tests to find the right balance for a long-term configuration.

So while I'm impressed my QX9650 could overclock to 4GHz with air cooling alone, in the long term I'll be overclocking by adjusting the multiplier only. **PCW**

Overclocking theory

Overclocking is the process of driving a component faster than it is officially rated to go. This is possible because component manufacturers build headroom into their parts so they run comfortably and reliably at their quoted specification. As enthusiasts discovered a long time ago, you can often exploit this headroom by pushing a component beyond its official rating.

In order to overclock a processor you have to adjust one of two numbers that derive its overall clock speed. One is the external bus speed and the other is the processor's clock multiplier. Models vary, but a 2.4GHz processor may employ a nine-times multiplier on a 266MHz external bus, resulting in a speed of 2400MHz, or 2.4GHz. Increase the multiplier to 10x and you'd drive the processor at 2.66GHz. Keep the multiplier fixed, but increase the bus to 300MHz, and you'd drive the processor at 2.7GHz.

It sounds simple, but there are a few points to consider. First, most processors have a locked multiplier, leaving the external bus as the only means to achieve an overclock. Increasing the bus speed may have an impact on other components, such as the memory and PCI interfaces, which are normally directly linked.

As you approach its limits, an overclocked component will also begin to act unreliably, or even prevent your PC from starting. A quick reset of the Bios settings will bring it back to normal, but hardcore overclockers will first try boosting the actual voltage to the required components as this often allows them to operate successfully. However, this will produce greater heat, which in turn requires greater cooling and may also have a negative long-term effect on the component.

Since any kind of overclocking pushes a component beyond its official limits, you may invalidate your warranty. As such, we cannot offer support should anything go wrong – so proceed at your own risk.

Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

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Beware Windows updates

Often touted as essential, there are times when you should avoid certain updates

A perennial subject for us is the attempts of enthusiasts to build and maintain the perfect home theatre PC. *PCW* reader Roy Houghton writes: "I have a media PC that no-one's allowed to use for anything else. Recently it started crashing after and during using My Pictures. I tracked the problem down to a Registry Key corruption. I found a fix which involved changing the long string of numbers in 'HKEYCURRENT_USER/Software/Microsoft/Windows/Current Version/Media Centre/MRU/PicturesMRU' to 0. I believe this may have been changed by a Registry cleaner."

Like Roy, I'm a strong believer in dedicating a home theatre PC to the job of entertainment alone in order to minimise the chance of anything going wrong. The trouble is, PC enthusiasts often find it hard not to tweak and easily forget the home theatre PC mantra of 'if it ain't broke, don't fix it'.

For me this even extends to many Windows updates. While essential for the smooth and secure running of an everyday PC used for web browsing and email, I'd question their relevance for a home theatre PC. Mine isn't sending or receiving email, opening attachments, clicking between websites, or copying data across systems. It simply plays DVDs, videos, music and slideshows of photos.

During years of using Windows Media Center Edition and Showshifter before it, I've never encountered any viruses or security issues with my home theatre PC. I have, however, experienced several serious problems with tweaks or updates that have rendered it unusable. The latest was a failed attempt for my XP MCE system to update itself to Service Pack 3. With updates turned on, it had been badgering me for some time to install it, but I'd deliberately avoided the process – after all, there was nothing wrong with my PC, so why risk it?

LG's dual-format HD DVD/Blu-ray drives come bundled with PowerDVD 7.3. Beware of the offer to 'upgrade' to version 8 though, as it loses HD DVD support

But one night, a slipped click saw the update slowly begin to install itself. The following morning I was met with a blue screen. Restarting the system failed to resolve the situation, and even the Windows installation DVD claimed the disk was corrupted. Luckily my TV recordings were on a second disk, but I still had to waste several hours reinstalling Windows before getting back to where I'd started.

I have no idea how or why this happened and should mention I've never experienced issues with Service Packs before. But if I'd left the PC alone, it would still be working today.

Less catastrophic, but still annoying, was Bob Andersson's issue. He couldn't select the audio or subtitle options from DVD menus when playing under Vista Media Center. The strange part was the menus were appearing in Windows Media Player.

After some head-scratching, Bob discovered the DVD Language options under Media Center Settings were all set to 'English' for Subtitle, Audio track and Menu. Changing all three to 'Title default' allowed the menus to appear during playback under Vista Media Center. So if you can't change your DVD audio or subtitle options from within Media Center itself, you know where to look.

DVD playback under Media Center can cause a number of configuration headaches, mostly because the decoding is performed by third-party software, such as Cyberlink's PowerDVD. Consequently any video or audio issues are often resolved by entering the decoder software's control panels rather than Media Center's own.

For example, I use an S/PDIF connection to transport audio from my media PC and, while system sounds are audible without modification, I have to set PowerDVD's audio options to 'use S/PDIF' and register the software before I can hear any sound from TV recordings.

PowerDVD is currently causing me and other HD DVD owners headaches, as HD DVD is only supported in version 7.3, while the latest version 8.x is for Blu-ray (and DVD) only. While 7.3 will also play Blu-ray discs, it's missing support for some of the latest Blu-ray technologies, so Cyberlink's bizarre solution is for owners of both formats to buy and install both versions.

While I don't expect Cyberlink to enhance its HD DVD support now the format is essentially dead, I equally don't see why it should be removed from its latest versions. Owners of LG's dual-format HD DVD/Blu-ray drives should also beware as the supplied PowerDVD 7.3 features an advert to 'upgrade' to version 8 without mentioning you'll subsequently lose HD DVD support. Naughty.

As always, if you're having any successes or failures with your media PC, let us know – but if you only remember one thing from this column, it's 'if it ain't broke, don't fix it'! **PCW**

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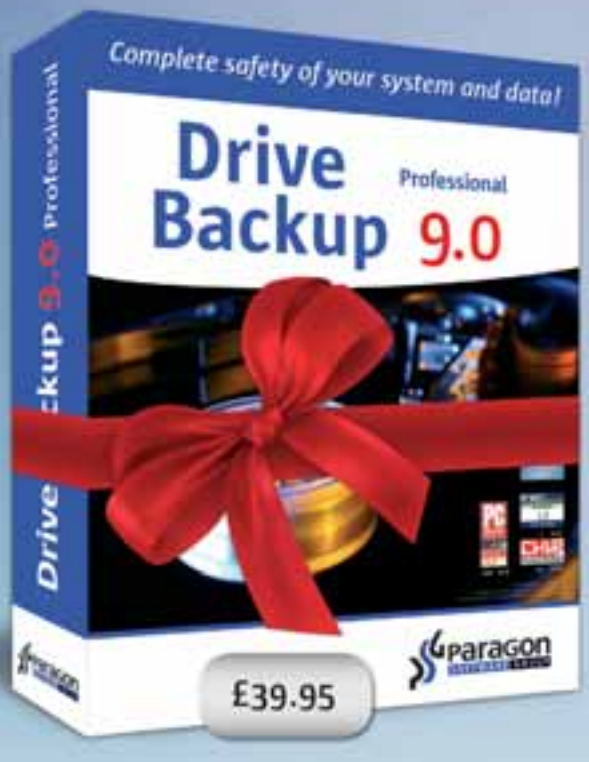

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Tim Nott is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

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Bubble and tweak

How to reclaim control of your Vista PC

We've been waiting for the Vista equivalent of Tweak UI for nearly two years, and it looks less likely that Microsoft is going to come up with anything to follow in the grand tradition of the 95/98/ME and XP Powertoys. So, let's say a big welcome to Winbubble.

This comprises seven tabs of tweaks. The General tab includes modifying the OEM info in Computer Properties and adding all sorts of right-click commands, such as the ability to turn the transparent Aero effect on and off with a right-click on Computer. The Specific tab lets you do traditional tweaks, such as removing the arrow from shortcut icons, as well as new twists, such as replacing the arrow with a little heart (see screen 1). You also get access to hidden screensaver options and a configurable panel of tools.

There's a whole tab devoted to system icon tweaking; a security tab to restrict access to various commands and hide drives; tabs for Internet Explorer and optimisation; and a miscellaneous tab that includes more context menu customisation. A further tab provides links to hints, tips and other tools on the Unlock For Us website. Winbubble is free and you'll find it at **http://unlockforus.blogspot.com**. As ever, tweak at your own risk, so make Restore Points before doing so.

Crying wolf

After downloading Winbubble, I had a good poke around the folders and files and discovered several .bat and .vbs files. You probably know that the former runs a batch of commands as if you had typed them in a command window, whereas the latter runs commands using the Windows scripting host. Neither is the sort of thing you'd want to run out of curiosity, so the smart thing to do is

A Vista candidate to succeed Tweak UI

right-click, then Edit, which will let you see the contents in Notepad. So, doing this, I was surprised to get a warning that a .bat file didn't have a digital signature, the publisher could not be verified and was I sure I 'wanted to run this software'?

Having checked that I hadn't misclicked, I found that right-click Open and Edit produced identical warnings, and to edit the file in Notepad I had to click the Run button. The VBS file summoned a different warning: 'While files from the internet can be useful, this file type can harm your computer. If you do not trust the source, do not open this software.' Again, you get the warning for both the Open and Edit commands.

Is this overweening or just sloppy? A bit of both. Just as many Vista users have turned off User Account Control (UAC) for being more trouble than it's worth, people will ignore these warnings – with regrettable consequences. Anyway, to set the record straight, you cannot execute code by opening a file in Notepad.

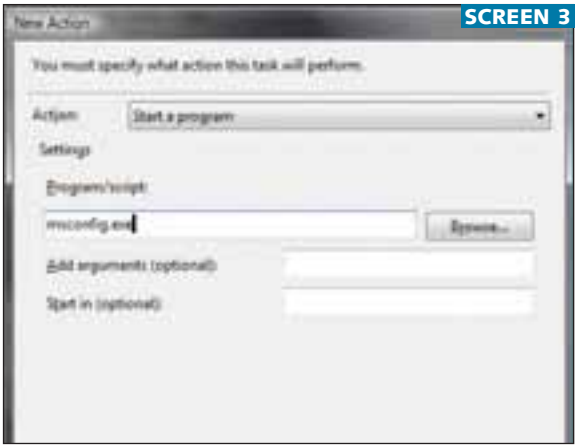
I've since found that first the same applies to Windows XP SP3, but not SP2, and that it also affects .reg files. What's happening here is that the files contain Alternate Data Streams (ADS). We looked at these in June 2008, but in brief a file on an NTFS partition can contain hidden data. Some common uses for this are attaching Summary Information to files, Favicons to browser bookmarks or history items, and Zone Identifiers to files. And it's Zone Identifiers that prompt this warning message.

Why the warning on running a file has been extended to editing it, I don't know, but you can get round this in several ways. The safest is to add a shortcut to Notepad to the Send To folder. Sending a file to Notepad won't produce the warning. Moving the files to a non-NTFS partition will also remove the ADS – and the warnings – completely, as will round-tripping it through a zip file.

UAC sidestep

Having mentioned Vista's UAC, here's a rather neat way to circumvent it for particular programs without turning it off globally. Let's say you want to run Msconfig.exe. You are logged on with administrator status, so you don't have to provide a password, but you do get the Secure Desktop (aka the Dark

Name that task



Above left: Specify a program

Above right: Check the settings

Screen of Panic) followed by a 'Windows needs your permission…' message. Here's a way to create a shortcut that bypasses this.

First start the Task Scheduler from All Programs, Accessories, System Tools. When you've jumped through the UAC hoop, the Task Scheduler will appear. On the right of the window, click on 'Create Task…' In the window that appears you fill in a task name (see screen 2) and make sure the 'Run with highest privileges' box is ticked.

Now switch to the Actions tab and click on the New button. The Action you want is 'Start a program' (see screen 3), which should already be in place and the Program/Script you want is Msconfig.exe. OK this and back at the Create Task dialogue, switch to the Settings tab. Make sure the 'Allow task to be run on demand' option is ticked and that 'Do not start a new instance' is selected if the task is already running (see screen 4).

OK this, and you've created your task. You'll see it listed in the top-centre pane of Task Manager. Now you need to create a shortcut (see screen 5). Right-click in the folder in which you want your shortcut to appear and click New, then Shortcut. In the box type:

```
Schtasks /run /tn "Run Msconfig"
```

The text between the double quotes should match the task name you gave it when you created the task. Click Next and give the shortcut a name – and that's it. Double-click on the shortcut and you may see a command prompt flash on the screen, but then the Msconfig window will appear without further ado.

Uninvited update

Meanwhile, back in the comparative tranquillity of XP, a strange thing happened. In the Start menu, All Programs, right up at the top table with Windows Update, there appeared a new item – Program Updates – which also appeared in Control Panel. It appeared to have come from Installshield and 'checks for updated versions of the programs installed on your computer'. I had no recollection of installing this piece of software. The Installshield Consumer Central website states 'Software vendors purchase the Update Service from Installshield as a tool to deliver updates to you'. Checking through its settings revealed that the only program it was monitoring was Google Sketchup Viewer, which rather pointed the finger of shame.

So, off to Control Panel, Add/Remove programs, where I couldn't find any trace of Installshield Update. But examining the entry in the Start Menu showed that it pointed to an executable in Program Files\Common Files\Installshield\Updateservice and this folder had been created around the same time as Sketchup Viewer's. It had also added two items to run at startup in the HKEY Local Machine section of the Registry. Now, we have a program that didn't ask to be installed, does not provide any means for its uninstallation, starts itself for all users with Windows and only seems to be monitoring one program's updates. This behaviour can be summed up in two words – 'cheeky' and the other is unsuitable for publication.

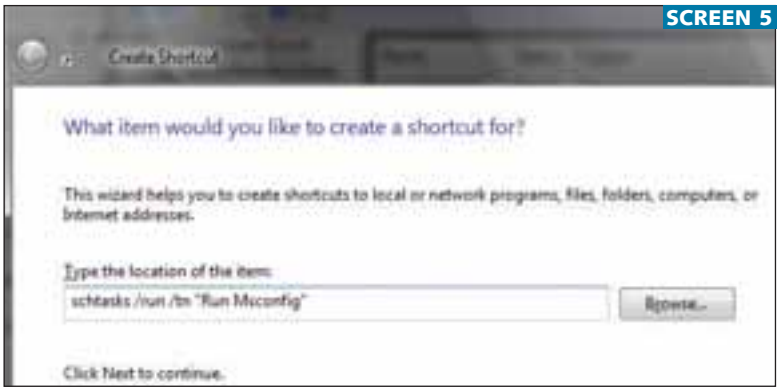
Installshield does provide a tool to remove this. Confusingly, this goes by a different name – Flexnet Connect Software manager – and you'll find it at **http://tinyurl.com/3z3pju**. However, despite a message stating that 'The Software Manager has been removed for your system' all this appears to do is remove the Registry entry that loads it on Startup and the Control Panel item. Program Updates was still in the Start menu, and running this restored one of the Registry Startup entries. So, although this is not the usual recommended procedure, running the removal tool again, deleting the Updateservice folder and its contents finally got rid of it.

Background

In Windows 98 and ME, it was possible to assign a background image to a folder with right-click and Customise. XP removed this facility from the UI, but you could overcome it by creating a Desktop.ini file. Vista, however, removed the capability completely.

Developer Andreas Verhoeven has come to the rescue with Vista Folder Background. This adds another tab to the 'Customise this folder' dialogue, entitled Folder Background, wherein you can set the background picture and text colour. You'll find it free at **http://mpj.tomaatnet.nl/vista/folderbg.html**.

Before you try this, there are two things you need to know. First you need to download and install Microsoft Visual C++ Redistributable, which you can get free at **http://tinyurl.com/ywoncl**. Second, when you unzip the Vista Folder Background file, you'll find you have two batch files – one to install and one to uninstall. Right-click on these and choose 'Run as administrator'. If you don't, the installation or uninstallation will fail, even though you are logged on with an administrator account. **PCW**



Create the shortcut

Azteca: Free game worth £12.95!

Go back in time to help the Aztecs solve an ancient mystery

On this month's cover disc, you'll find an extra special gift from the *Personal Computer World* team; a free full version of a PC game called Azteca. This fun game – worth £12.95 – is suitable for all ages and will keep you entertained for hours.

Simply click on the Games tab of the cover disc interface where you will find the Azteca details in the top left-hand corner. Alternatively, browse the disc to the Software/Games/Azteca folder and run the setup program.

The goal of Azteca is to release letters from each level, until you have all the missing words to solve the ancient Aztec mystery. Letters are released when you match three or more matching coloured discs in a row. To get them in the right order you need to rotate them by clicking on groups of discs. It might sound simple enough, but it's highly absorbing game play.

With 150 levels to work your way through, we're sure you'll find the game a great way of whiling away the hours. But try to collect all the letters placed on the clay discs as fast as you can – you don't have unlimited time!

When you've completed the game, you can also submit your high scores online and see how you match up against the experts, then try again and work your way up the leaderboard.

INFORMATION

System requirements Windows 9x/2000/XP/Vista, 30MB free disc space, internet connection required
Contact www.pcw.co.uk/games
Registration Not needed

How to play your free Azteca game

1 After installing the game, you'll find the Screenseven Game Center application in a folder on your Programs menu called Screenseven. Simply launch this to get access to your free game. Just click on the 'Play' button next to the Azteca picture to launch the game. For other downloaded games, you'll see your remaining play time clearly shown next to each game – this is removed when you purchase a game.

2 The opening menu of Azteca should appear, and if you click on the Options button you can adjust the game's sound and music volume, choose what colour depth you want (32-bit or 16-bit colour) and set the game to play in either full-screen or windowed mode.

3 To start a new game, click the Start button at the main menu and choose whether you want to start a new game or load a saved game. Click 'New Game' and you'll be presented with a welcome screen and then a basic gameplay guide.

HYPERBALLOID 2: TIME RIDER – FREE 60-MINUTE TRIAL!

VISIT THE PCW GAME CENTRE

Visit www.pcw.co.uk/games to try out more than 70 games. You can try every game free for 60 minutes.

New games are added daily, and range from Logic, Puzzles, Jump and Run, Mystery to Adventure games.

Try out as many games as you like and importantly, as you will be using the full version of the game, there are no restrictions on the gameplay during your 60-minute trial.

Along with the full version of Azteca, we thought you might enjoy trying out Hyperballoid 2: Time Rider – you'll find it installed along with Azteca. This is a new high for the breakout genre that pushes the boundaries of visuals, gameplay and user customisation. It has superb high-resolution graphics, outrageous new power-ups and silky smooth controls. And if you want to create new animated levels complete with realistic physics and modified bricks, you've got that, too, along with the ability to share your handiwork with the rest of the world.

COVER DISC

ON THE CD

Uniblue Disk Rescue 2009 ● Ashampoo Win Optimizer 5 ● RecentX 2.0 ● Alpha Five v9 ● Panda Internet Security 2009 ● Azteca

ON THE 8GB DVD

Uniblue Disk Rescue 2009 ● Ashampoo Win Optimizer 5 ● RecentX 2.0 ● Alpha Five v9 ● Panda Internet Security 2009 ● Paragon Drive Backup 9.0 Personal SE ● Azteca

Let our workshops on the following pages show you how to use some of the software on the CD and DVD

HELP LINES

WEB:
www.pcw.co.uk/disc-support

EMAIL:
disc-support@pcw.co.uk

PHONE: 020 7316 9706
(10am to 6pm Mon-Fri)

Note that we cannot give support for programs on the disc

SOFTWARE LISTING

ON THE CD

6 FULL VERSIONS

Alpha Five v9
Ashampoo WinOptimizer 5.10
Azteca
Panda Internet Security 2009
RecentX 2.0
Uniblue Disk Rescue 2009

RESOURCES (101 APPS, 8 CATEGORIES)

Backup, Restoration & File Management
Browsers, Managers & Extensions
Chat & Communication
Developer & Web Development Tools
General Utilities
Internet, Networking & Wifi Tools
Optimisation & Diagnostics
Security

ON THE 8GB DVD

EVERYTHING ON THE CD PLUS...

1 FULL VERSION

Paragon Drive Backup 9

30 FREEWARE

AceMoney Lite 3.12
Ad-Aware 2008 7.1.0.11
Adobe Air 1.5
Auslogics Registry Defrag 5.0.16.460
Belarc Advisor 7.2.24.12
Bullzip PDF Printer 6.0.0.702
Desk Drive 1.6.7
DFIncBackup 2.8
Find and Run Robot 2.33.01
Floola 4
Gobby 0.4.7
Google SketchUp for Windows 7
Griffith 0.9.8
HandBrake 0.9.3
Miranda IM 0.7.12
PhotoFiltre 6.3.2
Photology 2.0.116
Read It Later 0.9924
ReNamer 5.40
Safari 3.2
Secunia PSI 0.9.0.6
Spyware Terminator 2.5.0.567
StarBurn 10.5
Startup Delayer 2.3.133
Studioline Basic 3.50.62
Sweet Home 3D 1.4
Transmute 1.04
Ultra Defrag 2
USBDeview v1.27
Vuze 4.0.0.4

FROM THE MAGAZINE

CPU-Z 1.48
JPEG Recovery 3.0.1
JW FLV MEDIA PLAYER 4.2
Legacy 7.0
SteadyState 2.5
Tweak UI

6 GAME DEMOS

Between the Worlds
Command & Conquer Red Alert 3
Football Manager 2009
Hawaiian Explorer – Pearl Harbor
Hyperballoid 2
MotoGP 08

4 LINUX & OPEN SOURCE

Damn Small Linux 4.4.10
Kubuntu 8.10
Linux from Scratch 6.4
SLAX 6.0.8

18 SHAREWARE

Ashampoo AntiSpyware 2.04
Ashampoo Magical Defrag 2.34
Ashampoo Photo Optimizer 3
Auslogics BoostSpeed 4.2.7.172
Beyond Compare 3.0.10
EASEUS Data Recovery Wizard 4.3.6
FontExplorerL.M. 5.6.5
iCash 4.5
IDimager Personal 4.2.0.3
PowerArchiver 2009 11.01.03
ProgDVB 6.01
Signal for Windows 1.1.3
SMART Disk Monitor 8.0.0.23
TaskInfo 8.2
Total Uninstall 5.01
WinSnap 2.1.6
WorkTime 4.14
WPanorama 9.2.2

12 TRIAL SOFTWARE

Adobe Lightroom 2.1
Adobe Photoshop Elements 7
Camtasia 6
NoteZilla 7
O&O DiskImage 3.1.808
Paragon Hard Disk Manager 2009 Suite
PC Tools Disk Suite 2009
TuneUp Utilities 2009
Uniblue DriverScanner 2009
Uniblue Registry Booster 2009
Uniblue SpeedUpMyPC 2009
Webroot Internet Security Essentials

RESOURCES (168 APPS, 12 CATEGORIES)

Audio, Video & Photo
Backup, Restoration & File Management
Browsers, Managers & Extensions
Burning & Media
Business, Office & Collaboration
Chat & Communication
Developer & Web Development Tools
General Utilities
Internet, Networking & Wifi Tools
Optimisation & Diagnostics
Portable Applications
Security

THE UK'S BIGGEST & BEST SOFTWARE COLLECTION!

USING THE COVER DISC

The *PCW* cover disc uses a web browser-style interface. To get full functionality, you'll need to use Microsoft Internet Explorer (version 5.5 or later). Unfortunately, Netscape doesn't properly support this software. However, we have also provided links to the featured programs, so you can still copy them to your hard disk or install them manually (the standard download dialogue box will appear). Programs can be found in the \software\folder on the disc.

STARTING THE DISC

The CD-Rom (or DVD) should auto-start. If it fails to do so, double-click the CD-Rom/DVD icon in My Computer or open the terms.htm file on the root of the disc.

PROBLEMS?

We cannot give support on programs on this disc. If you have problems running the disc, follow these guidelines:

PROBLEMS INSTALLING/RUNNING THE SOFTWARE

Check the support page on the disc or check the manufacturer's site.

GENERAL DIFFICULTIES

For details on cover disc support and frequently asked questions about the discs go to **www.pcw.co.uk/disc-support** For faulty or damaged CDs/DVDs please email disc_support@pcw.co.uk for a replacement, giving the details requested on the website. If you have no internet access, call 020 7316 9706 between 10am and 6pm Monday to Friday. Please note that *PCW* cannot give technical help/support.

General licence restrictions, February 2009

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It is recommended that you back up any programs and data on your hard disk before installing this software.
PLEASE READ INSTALLATION AND SYSTEM REQUIREMENT INSTRUCTIONS CAREFULLY BEFORE USING.
The publisher, Incisive Media, has checked this DVD-Rom for known viruses at all stages of production, but you are advised to check all programs and discs accessed on your PC yourself before using them, with an up-to-date virus scanner.
No part of this DVD-Rom may be reproduced without prior permission of Incisive Media.

incisivemedia

Uniblue Disk Rescue 2009

Keep your hard disk running at top speed with this disk defragger

Defragmenting your hard disk occasionally is a simple, but effective, way to keep your system running at peak performance. You could leave Windows' own defrag tool to handle the job, but it's slow and inefficient; Vista's defrag utility won't even give you an estimate of how defragmented a disk might be (unless you use the command line version), making it less convenient to use than the XP version.

Fortunately, Uniblue Disk Rescue 2009 takes a different approach. Launch the program, click Start Scan and it'll run a quick analysis of your hard disk (it took just a couple of minutes to scan 200GB of data on our test PC). You'll then get a detailed report on your file system, including the number of fragmented files and the largest contiguous block of free space, so it's easy to figure out if a defrag session is needed.

If you decide to defrag the disk, click one button and Uniblue Disk Rescue 2009 will start optimising your file layout. It's a speedy process and so the best approach is just to leave the system alone for a while and let the program do its work to have you running at full speed again.

The manual process only requires two clicks, but if that's still too much like hard work, you can always set up the scheduler to run defrags automatically. There are two options available. Choose the ongoing defragmentation and the program will kick in once your PC has been idle for five minutes. Or you can schedule the Uniblue Disk Rescue 2009 to run on a particular time and day – even if you're not around.

INFORMATION

System requirements Windows XP and Vista (32-bit), 100MB free hard disk space
Contact www.uniblue.com
Registration Go to http://ca.uniblue.com to get your free code
Need to know You need at least 10 percent of your hard disk space to be free in order for the scan to work

Speed up your hard disk in three easy steps

1 Launch Uniblue Disk Rescue 2009, specify the hard disk you'd like to defragment, then click Start Scan. Now wait as the program crawls all over your file system looking for fragmented files and checking your free space. Don't worry, though – despite all the work going on, this only takes a couple of minutes.

2 Once the scan is complete, you'll probably discover your hard disk has an alarming number of fragmented files, in which case you should click the Defrag button and let Uniblue Disk Rescue 2009 rectify this unfortunate situation immediately. Leave the program alone in order to get the best possible defrag speeds.

3 You've set up your hard disk to deliver its best possible performance. But how to keep it that way? Easy: just click Scheduler, check 'Ongoing Defragmentation' and click Apply. Uniblue Disk Rescue 2009 will now start defragging whenever your PC is idle for five minutes, ensuring the hard disk is always optimised.

UPGRADE OFFER

NEW FEATURES

Faster startup and shutdown
Improve stability and security
Customise Windows' appearance
Easily navigate Windows settings
Enhance IE and other applications
Explore up to 1,000 PC tweaks

GET SYSTEM TWEAKER FOR FREE

Uniblue System Tweaker provides easy access to 1,000 different Windows tweaks covering all kinds of areas: simplifying and speeding up your PC startup and shutdown, making your system more stable and secure, customising Windows' appearance to suit your needs, providing easy access to Windows and system settings, and enhancing Internet Explorer and other key applications. And you can get it free by purchasing just one Uniblue tool from our Registration page. Find out more at **www.uniblue.com**.

Ashampoo Win Optimizer 5

Clean, tune and tweak your PC with this one-stop utility suite

Ashampoo Win Optimizer 5 is a comprehensive toolkit that provides everything you need to clean, optimise, tune and manage your PC.

If your system's weighed down with too much junk, you can use the Drive Cleaner to remove redundant files. The Registry Optimizer will detect and delete leftover Registry entries, and Internet Cleaner will erase your browser cache, history, cookies and more. If you're more concerned about general performance issues, the built-in defrag tool and startup program manager will be interesting. There's also an internet tuner to automatically optimise your internet connection settings, and a module to provide easy access to performance settings in Explorer, Internet Explorer, Firefox and more.

The Privacy and Security section includes handy modules like a secure file deletion tool and a file encryption program with the ability to create self-decrypting .exe archives. You can also choose to hide particular drives in My Computer and Explorer to prevent other users of your PC from tinkering with important files.

Keep browsing the modules and you'll also find a file undelete tool, a visual styler, an icon saver to save and restore desktop icon positions, and a tool to explore how your hard disk space is being used.

If exploring all these options sounds like a lot of work, it is, but Ashampoo also comes with a one-click optimisation tool that scans your hard disk, Registry and settings for problems, and resolves them all in a single click.

INFORMATION

System requirements Windows 2000/XP/Vista, 40MB hard disk space

Contact www.ashampoo.com

Registration Leave 'Get full version key' checked during installation, or launch the program and click Get Full Version to get your free registration key

Squeeze the maximum performance out of your PC

1 Is your PC set up to run unnecessary software that's sapping your system resources and slowing you down? To find out, Click Optimize Performance, then StartUp Tuner. Click Autostart Entries and disable any Windows startup programs you don't need, then click Services and disable any Windows services you don't need.

2 To get access to many Windows settings, click Tune System Settings, then Tweaking. Clicking on Drives, then Cache, will let you tweak the Windows drive cache and improve system speeds, for instance. Or if you want an easier life, click Introduction, select 'Optimize system settings automatically', and the program will tweak everything in one go.

3 If your internet connection seems slow, click Tune System Settings, then Internet Tuner. Click Adjust Automatically to have the program optimise your connection settings (an unnecessary taks under Windows Vista, as it tunes your settings itself), or click Edit Protocol Manually if you want to try doing it yourself.

UPGRADE OFFER

NEW FEATURES

Defrag 3
Antispy module
Boot time defragmenting
Defragmenting service
Context menu manager
Favourites register

GET ASHAMPOO WIN OPTIMIZER 6

Move to Ashampoo Win Optimizer 6 and you'll discover the program can defragment your system when it boots, giving much better results as it can now defragment files that would otherwise be open and locked. There's also an anti-spyware module, as well as a content menu manager that makes it easy to remove redundant entries left behind by long-uninstalled applications. The list price for all this would normally be £29.99, but as a registered owner of Ashampoo Win Optimizer 5, you can upgrade for only £7.49, a very generous 75 per cent discount. To place your order, click Internet, then Upgrade.

RecentX 2.0

Get faster access to files, folders, applications and websites

It's a fundamental law of computing that the file you need is always at least four folders away from your starting point, so most people are well used to clicking around their hard disk looking for the document they need. But there's a better way and it's called RecentX.

As you use your PC, RecentX remembers all the files you've accessed recently – and most frequently. Click the file button on the RecentX toolbar, double-click the file you need and it'll open in the associated application.

RecentX supports drag and drop, too. So if you want to add a file as an Outlook attachment, say, you don't have to manually work your way through the Attach File dialogue. Just launch RecentX, drag and drop the file onto the New Message dialogue and away you go.

The program also remembers folders you've accessed; if you try to manually browse eight folders deep on a network computer, for instance, it could take a while, but launch RecentX, click the Folders tab, double-click the folder you need and you'll jump straight there.

Other RecentX tabs provide quick access to programs on the Start button's All Programs option, Favourites and browsing history. It can be a lengthy list, but entering a keyword in the Find box and RecentX will display matching hits.

While RecentX sounds like a search tool, it isn't. The program doesn't index your hard disk, so won't degrade system performance. Instead it just records the files and folders you access most frequently (or recently), then makes them available in a more convenient way.

INFORMATION

System requirements Windows 2000/XP/Vista (32- and 64-bit), 6MB disk space
Contact www.conceptworld.com
Registration Get your registration key from www.conceptworld.com/RecentX/vnu

End your file and folder navigation hassles – forever

1 Need to examine or edit an important file you've accessed recently? You could launch its application, click File, then Open, and browse through your hard disk until you find it. It will be much easier, however, to launch RecentX, type a few letters from the filename, then double-click on the document you need.

2 Copying a file from your desktop to a distant folder normally involves Windows Explorer and way too much double-clicking. But again, RecentX has a simpler solution. Just click the Folders tab and browse or search for the folder you need, then right-click on it and select Paste Here to transfer any copied files.

3 Click the Programs tab to immediately access all your recent and most frequently used programs, without having to search through the entire All Programs list on the Start menu. Or click Websites to locate sites from your browser favourites, bookmarks or history in seconds (the program supports both Internet Explorer and Firefox).

READER OFFER

NEW FEATURES

Create virtual sticky notes
Organise notes into folders
Attach notes to websites & documents
Powerful note search tool
Share notes with others
Sync notes with Outlook, Palm OS

SAVE 30 PER CENT ON NOTEZILLA

This is the very latest version of RecentX and so there's no update available. However, Conceptworld is offering a special deal on its sticky notes program, Notezilla, which allows you to create virtual notes (optionally including graphics), then organise them into folders or attach them to any document, website, program or window. Reopen that website, say, and the note will reappear. Normally priced at around £20, you can purchase the program for around £14 – a 30 per cent discount. Find out more at **www.conceptworld.com/RecentX/vnu**.

Alpha Five v9

A selection of powerful sample applications makes it easy to learn the Alpha Five basics

INFORMATION

System requirements Windows 2000/XP/Vista (32- and 64-bit), 210MB hard disk space
Contact www.alphasoftware.com
Registration Choose 'I want to evaluate Alpha Five V9' at the Registration screen to start your 180-day trial period
Need to know This version will expire 180 days after installation

Microsoft Access has been the big name in PC database applications for many years, but it's not your only option. Alpha Five v9 is a particularly powerful development tool with a number of features you might find interesting.

The program includes a comprehensive library of reusable components that makes it quick and easy to develop desktop and web applications. It works with its built-in database or all the big systems (MySQL, Oracle, DB2, Enterprise DB and SQL Server). Powerful Ajax code ensures excellent performance on the web, and Alpha Five provides a full security framework for all your apps.

If the point-and-click simplicity isn't enough, you can get more control with Alpha Five's built-in Action Scripting and Xbasic programming language, which bears a resemblance to Visual Basic, so is very easy to pick up.

Alpha Five offers good control over the look and feel of your application. Visit **www.alphafivedatabase.com/access/whychooseAlpha.asp** for some excellent examples. You also get point-and-click field rules, allowing data to be entered quickly and accurately. The powerful report writer provides a helpful wizard, and the system is based around a well-designed data storage model where data/indexes are stored in separate files.

UPGRADE OFFER
BUY ALPHA FIVE V9

If you find Alpha Five v9 useful and would like to continue using it after the 180-day trial, then you'll need to purchase a licence, priced from £270 for a single user. If you want to distribute your applications, then you'll also need either a runtime, run engine or application server licence. However, you can purchase an Alpha Five bundle that includes the application and the runtime or run engines you want. There are too many options to explain here, but follow the Order links at **www.alphasoftware.com** for details.

Panda Internet Security 2009

Panda Internet Security 2009 provides fast, effective real-time protection against just about every online threat

INFORMATION

System requirements Windows XP/Vista (32- and 64-bit), 275MB hard disk space
Contact www.pandasecurity.com/uk
Registration Choose to Activate the program when requested, enter your email address, and you'll get 90 days of free updates
Need to know Expires 90 days after installation

It's no secret that the web is a dangerous place, and you probably have one or more tools designed to help keep your PC safe from harm. So why try Panda Internet Security 2009?

For starters, the anti-virus engine doesn't just automatically detect and eliminate all known threats, its Truprevent 2.0 technologies will also pick up undiscovered dangers based on their behaviour alone.

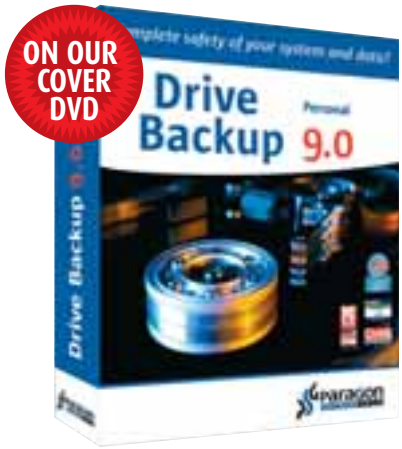
The new Collective Intelligence technology improves malware detection performance by carefully analysing data from other Panda users who have signed up. If the suite detects the same file in use across many installations, for instance, it reasons that this is less likely to be malware; it won't be checked as often and your scans will complete more quickly.

The firewall protects you from incoming worm and hacker attacks, while also blocking malicious programs you might have installed from making unauthorised internet connections. It includes a built-in wireless monitor too.

Comprehensive internet browsing protection includes an anti-phishing filter, web filter and parental controls. The new anti-spam filter aims to keep your inbox free of junk, and in our tests was one of the few tools that can compete with the leading standalone anti-spam tools.

UPGRADE OFFER
EXTEND YOUR PANDA LICENCE

This copy of Panda Internet Security 2009 provides everything necessary to keep your PC safe from online threats for 90 days. If you want to use the program after that, you'll need to extend your Panda Internet Security 2009 licence. Prices start at £25.79 for a six-month extension, but pay £94.58 and you'll be covered for three years. And as the licence covers up to three PCs, the cost could be as low as 88p per system per month. Click on Buy on the main Panda Internet Security 2009 console, or visit **www.pandasecurity.com/uk**.



Paragon Drive Backup 9 Personal SE

Keep your data safe with this fast, efficient backup tool

Install Paragon Drive Backup 9.0 Personal SE and you'll get a very capable image backup tool that can clone any hard disk or partition with the minimum of hassle, saving the resulting image to local drives, a network system, CDs or DVDs.

Most drive-imaging programs take a long time to carry out their work, but this is different. Paragon Drive Backup 9.0 Personal SE can build differential backups (images that contain only new or modified files), so after the first full backup, subsequent runs can be considerably faster. You may still want to back up a particular set of files or folders occasionally, but the program helps there, too. Launch the file wizard, select the files you need, then copy them to a local/network drive, or burn them to CD/DVD.

Paragon Drive Backup 9.0 Personal SE even has a very useful disaster recovery option in its ability to save your hard disk's Master Boot Record (MBR). This only takes a few seconds, but is worth doing, as your PC probably won't be able to boot if the MBR is subsequently corrupted by a virus or other disk tool. Build a Paragon Drive Backup PSE recovery disc beforehand, though, and you'll have your PC back in full working order in minutes.

The package is completed by a range of useful hard disk tools to create, format, delete, hide and unhide partitions; check your file system or disk surface for errors; and change low-level details like the partition serial number and ID. Paragon Drive Backup PSE is an essential component for every hard disk toolkit.

INFORMATION

System requirements Windows XP/Vista (32- and 64-bit), 110MB hard disk space
Contact www.paragon-software.com
Registration Click 'Get Free Serial' during installation

Three reasons why you need Paragon Drive Backup 9.0 Personal SE

1 If you're looking to back up your system then an imaging tool like Paragon Drive Backup 9.0 Personal SE delivers the best results. It's reliable, features straightforward wizards that walk you through any tricky steps, and lets you restore a backup and be up and running in the shortest possible time.

2 Paragon Drive Backup 9.0 Personal SE doesn't just carry out conventional full image backup, though. It can also create differential or incremental backups (see the Wizards menu). And if you only want to copy your Music or Pictures folder, say, then there's a module to help (click on Tools, then File Transfer Wizard).

3 Click Tools, then Recovery Media Builder, and the program can even create a bootable crash recovery disc, which is ideal if your hard drive is corrupted and the PC won't start. This can fix common boot problems, restore a backup, or, as a last resort, transfer your most important files to another system.

UPGRADE OFFER

NEW FEATURES

Exclude files and folders
Save open files
Backup capsule
Built-in scheduler
Blu-ray disc support
Dual-boot data recovery

SAVE 20 PER CENT ON PARAGON RANGE

Move to Paragon Drive Backup 9.0 Personal and you'll be able to exclude some files and folders from your image, speeding up the backup process. A scheduler runs backups automatically and writes the image to a backup capsule (a special partition on your hard disk). This capsule can have its own Linux or Dos recovery environment, making it easy to restore your backup whenever necessary. Paragon Drive Backup 9.0 Personal normally costs around £27, but register Paragon Drive Backup 9.0 Personal SE and you'll qualify for a special 20 per cent discount on this and any other program in the Paragon range. Check your registration email for more details.

Barry Shilliday has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time he prefers to travel the world – and snap it with his camera.

→ Comments welcome on the Linux/Unix column.
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Please do not send unsolicited file attachments.

Ubuntu 8.10 arrives

What to expect from Intrepid Ibex, the brand new Ubuntu distro

As those of you who regularly read this column will know, the end of the year means a new season not only in the meteorological sense, but also with new releases of the major Linux distributions. With Ubuntu Linux the most popular choice of distribution, this month we will take a look at some of the features of the new version.

Ubuntu follows a strict six-month release cycle. The current version, released in October 2008, as usual takes its release name from that date – Ubuntu 8.10 – also colloquially known as the Intrepid Ibex, or Intrepid for short. The previous version, 8.04, is a 'long-term release', which means it is supported through updates on the desktop for three years and five on the server. Intrepid is a standard cycle release and as such is supported for 18 months. Quite often this status indirectly means a slightly more risky release, with some cutting-edge software and major development changes. If that's what you are looking for, however, you won't find it here.

As Ubuntu synchronises with the Gnome desktop release schedule, Intrepid takes in the full latest Gnome version, bringing it up to the 2.24 series. The changes in the desktop software are naturally carried over into Ubuntu's releases and often provide many of the new features as a whole. Gnome 2.24 unfortunately is rather lacking in that respect.

Nautilus, the file browser, now has support for tabbed viewing, similar to that of web browsers such as Firefox. There are other minor improvements, including better handling of screen resolutions, and a new instant messaging client – although this is not installed as standard with Ubuntu.

Applications receive the usual small upgrades, which fix bugs and can result in better performance and enhancements in functionality. Pidgin, the popular instant messaging client that Ubuntu has stuck with, has had a boost from version 2.4 to 2.5, for instance. The image manipulation application, the Gimp, has been upgraded to version 2.6. This is one of few major upgrades of Intrepid and provides some improvements on the older version, including some interface enhancements.

SCREEN 1

The new Intrepid desktop is not dissimilar to Hardy

Be my guest

Of course, the Ubuntu developers haven't been idle over the past six months, and some useful additions have made it into the Intrepid desktop. The new 'guest session' feature is particularly attractive. This lets you switch your current logged-in session to a temporary new one, so that another person can use your computer without having any access to your files or settings. The files for the guest session are stored in memory and are destroyed once the session is logged out, or the computer is shut down.

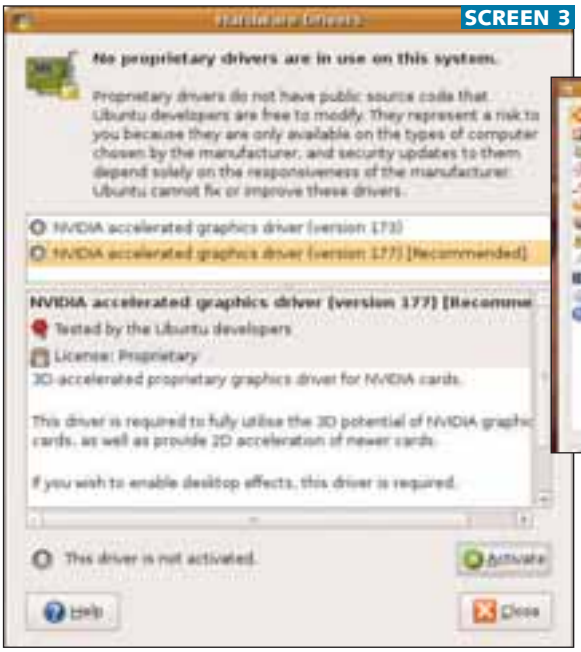
Another new feature is improved networking support. The Network Manager application, which maintains the connection to the internet or the local network, now has good support for mobile broadband and mobile data connections. It was possible previously to configure these with Ubuntu, but now it is handled automatically with the updated networking tool. For example, if your mobile phone supports 3G, you should now be able to plug it in via a USB cable and access the internet immediately, without having to configure anything or install any software or drivers. Owners of mobile broadband dongles for fast internet access on their laptop should find things similarly simple.

The improved networking is especially important to owners of netbooks – small laptop computers that are increasing in popularity, such as the Dell Mini or Acer Aspire One. Additionally, the improvements in the kernel of Intrepid mean these devices are much better supported in general.

Intrepid has not been designed specifically to run on netbooks, but many of them will install with most of, if not all, the hardware working fully. The kernel improvements have also led to better support for Wifi devices, making wireless internet access easier and more reliable.

SCREEN 2

The prompt to install codecs now includes an option to purchase them



Using the Hardware Drivers utility, users can install proprietary drivers easily

Below: Always install the restricted extras, unless you are certain you will never need them

TV and radio streaming

One final addition, although still in a fairly early development stage, is a plug-in for the media player Totem that enables you to view streamed BBC content. Canonical, the company behind Ubuntu, has worked with the BBC to provide certain radio and television content freely available.

At the time of the release, only radio programming was working, although this should change in the coming months. George Wright, a developer for the BBC, said: "This clearly is not a competitor to BBC iPlayer. It has a lot of BBC content that is already available, but you won't see *Doctor Who* or *Dragons' Den* on there any time soon. What you will see is an increasing list of content, in both audio and video formats, that we can share with you in an experimental way, allowing us to explore and test new ways of viewing and listening to some of our TV and radio shows."

Overall, Intrepid adds a sprinkling of minor changes and enhancements, but is a very safe and conservative release (see screen 1). A fully updated version of Ubuntu 8.04 (Hardy Heron) is still a good choice next to Intrepid, and is by no means inadequate.

One particular disappointment is the lack of Openoffice 3, which was released shortly before Intrepid. As a major component of the desktop, an upgrade to this new version of Openoffice would have been a compelling reason to upgrade, which, on the whole, is somewhat lacking. However, if you have a netbook, or a laptop with mobile broadband, Intrepid may be much more appealing.

Setting up

The installation routine doesn't really differ from previous releases. The partitioning screen in the graphical installer has had a redesign and looks more pleasant but otherwise retains the same functionality. Once installation is complete, there is a little left to do before the desktop is ready for use.

As with earlier versions of Ubuntu, there are no codecs installed for patented multimedia formats. One difference with Intrepid is that you can purchase these codecs from Canonical (see screen 2). When you click on a file that cannot currently be played, such as an MP3 audio file or an MPEG-4 video file, Totem will prompt you to either install freely available open-source codecs or purchase them. For people in Europe, and most parts of the world outside the US, there is no need to purchase any codecs as the patents are not recognised, so let Totem go ahead and install the freely available versions.

Intrepid will search your computer for hardware that can benefit from proprietary drivers, such as Nvidia and ATI graphics cards. The Hardware Drivers tool will notify you if any software is available for your system (see screen 3). These graphics drivers will enable the 3D desktop effects, which will already be working on laptops with Intel integrated graphics hardware. At the time of writing, there was a bug with the Nvidia drivers that caused the borders of windows to be displayed incorrectly with the 3D effects enabled. Switching the border theme to Clearlooks in the Appearance preferences application was a workaround for this; a bug fix may have been released as you read this.

Useful extras

Ubuntu has an advantage over several of its competitors with the 'restricted extras' package. I always recommend that everybody, unless they explicitly do not need a full desktop setup, install this package (see screen 4). It pulls in several useful pieces of software, including Sun's Java, Adobe's Flash Plug-in (see box), all the multimedia codecs you could need, and Microsoft's ever-present web fonts (such as Arial and Times New Roman). Readers who are used to Windows, where everything must be downloaded and installed from websites, frequently email queries about how to install these kind of extras. To install them in Ubuntu, load the Add/Remove tool from the Applications menu and enter 'restricted' into the search box. Ensure that the search box is selected to show 'All available applications', as it defaults to supported ones only. The Add/Remove tool could not be easier to use; it will download and install the necessary software packages. **PCW**

Adobe Flash for Hardy and Intrepid

When Adobe released version 10 of its Flash Player software, the Linux release came at the same time as the Windows version. Adobe has also this time released .deb packages that can be installed directly into Ubuntu Hardy or Intrepid. For Intrepid users, the latest version is available through the repositories, either directly or via the 'restricted extras' package.

Hardy users can download the .deb package from Adobe's website and double-click the downloaded file to install it. The package name in the Ubuntu repositories is different from the Adobe version, so you should uninstall the older Flash Player first. Load the 'Add/Remove' tool and untick the 'Macromedia Flash plug-in' entry to uninstall the Ubuntu version, then install the Adobe package.

Ken McMahon is a freelance journalist and graphic designer. His involvement with digital cameras began with a Commodore 64. He graduated to Macs and now works mostly with PCs.

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House of cards

All you need to know about your camera's memory card

Media isn't what it used to be. In the days of film, your choice of stock was an important and individual thing. Not only was it a question of making the right choice for technical reasons, personal preference was also a factor when choosing from available black and white, colour negative and transparency emulsions.

Though your choice of digital media won't affect the quality of your images in the same way, it still has important consequences and you need to think about more than just capacity when buying. Reliability, durability, read and write speeds and compatibility are all issues you need to consider – and, of course, price.

Other than first-time digital camera buyers, many of us are influenced in our choice of media by the format used in our existing camera. Being a Canon DSLR user, I've tended to favour Compact Flash card cameras when I've been on the lookout for a compact camera. These days, though, with the cost of media becoming less expensive, it isn't so much of an issue.

Sony's Memory Stick aside, two formats – CF (Compact Flash) and SD (Secure Digital) – account for the lion's share of the digital media market. If there were any advantages in one format over the other, it was that SD cards used to be slower and more costly. These days there's less to choose between them in either cost or performance.

The technology

Both CF and SD cards use solid-state, non-volatile Flash memory to store data. In addition to the memory chips, the cards contain a controller that handles communication between the card and the device that's writing to or reading from it.

Generally speaking, cards use two kinds of Flash memory cells. The fastest cards use Single Level Cell (SLC) memory. Multi Level Cell (MLC) memory is cheaper, but slower and less durable. Eventually, after many thousands of erase/write cycles, Flash memory cells lose their capacity to store data and this happens sooner in MLC memory than in SLC.

Sandisk's website provides a compatibility checker that recommends cards for your camera

Memory cell failure doesn't render a card unusable because the controller flags the expired cells and avoids them. Controllers 'average out' write/erase operations across all the available cells on a card in order to reduce wear and tear on individual cells.

There's a third type of card that uses a miniature disk drive, or microdrive, in a Compact Flash type II format (see later under 'Compatibility'). Though less robust than Flash memory cards, microdrives previously enabled larger capacity cards to be manufactured. Now Flash memory card capacities have increased, microdrives are fast becoming obsolete.

Both CF and SD cards use the Windows Fat file system. CF cards larger than 2GB use Fat32, as do SD cards larger than 2GB and Secure Digital High Capacity (SDHC) cards. Larger cards may not be compatible with your camera, so before buying one you'll need to check your camera and card reader support the Fat32 file system – more about that later.

What size cards should you use? In price terms, there's little to be gained, or lost, by going for larger capacity cards. An 8GB card in a particular manufacturer's range will be about the same price per gigabyte as a 2GB card.

On the plus side, you'll get a lot more pictures on an 8GB card before you need to change it. The drawback is that if a card fails, or you accidentally format it, you will lose more pictures.

Compatibility

There are two types of CF: type I and type II. Type I cards are 3.3mm thick and type II are 5mm thick. Type I cards are more common these days; CFII cards were used in the past for larger capacity cards and microdrives. Many cameras that use CF media will accept both types, but some recent models, such as the Nikon D700, only take type I cards. Given that nearly all cards these days are type I, this isn't something you need to worry about.

The only other CF card compatibility issue you need to consider is size. You'll only be able to use Fat32 cards of 2GB and larger in more recent cameras. My Canon EOS 20D, which was released in 2004, supports Fat32, as do most DSLRs manufactured from the beginning of that year. If you use a card reader to transfer images to your PC, you'll also need to check that it is compatible with the larger cards.

The situation with SD cards is a little more complicated. There are two versions – SD and SDHC. SD cards have a maximum capacity of 2GB, SDHC cards have a maximum capacity of 32GB, making them ideal for video use as well as high-volume photography. Older cameras that use SD cards won't be compatible with SDHC cards. The only exception is where a manufacturer

Only more recent DSLRs such as Canon's EOS 50D will be able to take advantage of the fastest CF cards on the market

has released a firmware update as, for example, in the case of the *ist DL and K100D from Pentax and some Canon EOS-1Dx models.

The situation was complicated by the introduction of 4GB SD cards, which had limited compatibility in both cameras and card readers. If you're planning to buy large-capacity media and you're concerned about compatibility, check your camera documentation. If you can't find anything there, try the card makers' websites (see screen 1). There's a compatibility checker for Sandisk cards at **www.sandisk.com/Compatibility**.

'Flash memory cards are robust and can tolerate a surprising amount of mistreatment'

Speed freaks

One of the biggest factors affecting media cost is write speeds, but there's little point in paying a premium for fast cards if you either don't need the speed or your camera can't make use of it. Most DSLRs have a generous buffer capable of storing several full-resolution Raw image files (and even more JPEGs) and it's not until this fills up that the card speed becomes important. Once that happens, unless your camera can write at speeds comparable with the card, you won't get the kind of throughput you're paying a premium for.

The Canon EOS 20D can shoot 5fps (frames per second) and its buffer can hold around 23 full-resolution JPEGs, so I can shoot at least 23 frames at 5fps before the buffer fills up and I have to wait for some of those images to be written to the card. In practice, it will be more because some data will have written to the card during shooting.

Only then does card speed come into it. When this point is reached, faster cards will empty the buffer more quickly and enable me to start shooting again, but only up to a point. I'd consider paying extra for a 30Mbytes/sec card, but I doubt that using a 45Mbytes/sec card would yield further improvement. Newer cameras, such as the Canon EOS 50D, for example, which feature continuous JPEG shooting at 6.3fps, would undoubtedly benefit from such cards.

Card speeds for CF media are typically framed in the same fashion as CD write speeds – multiples of 150Kbytes/sec. For example, 300x card would write at 45Mbytes/sec. Some manufacturers just quote the throughput in Mbytes/sec.

Two of the biggest and best-known card manufacturers, Lexar and Sandisk, produce cards that range in speed from pedestrian to, well, pretty fast. Lexar's range goes from Platinum 80x (12Mbytes/sec) to Professional 300x (45Mbytes/sec). Sandisk provides similarly paced products ranging from the 15Mbytes/sec Ultra II cards to the 45Mbytes/sec Extreme IV cards.

In top-end cards, Lexar and Sandisk have implemented Ultra Direct Memory Access (UDMA) transfer modes, increasing the maximum theoretical throughput to 66.7Mbytes/sec in the case of Mode 4 and 100Mbytes/sec for Mode 5. You might be more familiar with these specs from the hard disk interface standards in which they're implemented – ATA 66 and ATA 100, respectively.

Lexar's top-range Professional UDMA 300x cards implement UDMA Mode 5, and Sandisk's Extreme IV range implements UDMA 4. Of course, to gain any benefit from these improvements you'll need a UDMA-capable device. Currently the only camera I'm aware of that supports UDMA is Sony's DSLR-A900, which has UDMA 5 support. The real advantage of these cards kicks in when transferring images to your PC. If you want to know how various cards stack up in terms of performance on a range of camera hardware, the best place to look is **www.robgalbraith.com**.

To make the most of UDMA cards, you will need a UDMA-equipped card reader. Along with its UDMA 300x cards, Lexar introduced its Professional UDMA Dual-Slot reader. The reader accepts CF and SD(HC) cards, and its CF controller supports UDMA up to Mode 4 and PIO (programmed input/output – the transfer mode used in all other cards) up to Mode 6, so as well as blisteringly fast transfers with the UDMA cards you'll benefit from swift transfers even with your existing non-UDMA cards. Lexar also makes a Firewire 800 version of the card reader, which supports UDMA up to Mode 5, has a single slot for CF and can be daisy chained. The USB model retails for around £17.99 and the Firewire model for about £54.99.

Flash memory cards are remarkably robust and can tolerate a surprising amount of mistreatment. The worst I've managed is to drop them, but stories abound of cards that have been through the washing machine with no ill effects. If the Hands On mailbox is anything to go by, most data loss is either unexplained, or self-inflicted. Next month I'll look at methods for recovering lost pictures when Flash memory cards go bad. **PCW**

Lexar's Professional UDMA Dual-Slot USB reader

Tim Nott is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

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Better than bus tickets

How to insert and use bookmarks, and rooting out the curious logical not sign

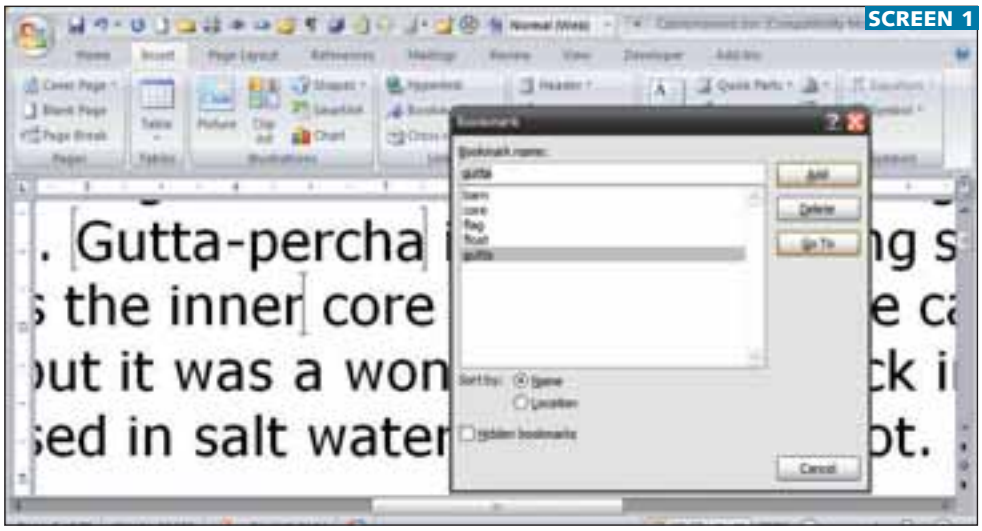
Bookmarks in a document let you jump to a particular location instantly, but not only can you bookmark a page, you can also go to a point in the text or a range of text, as well as automate documents with macros and fields.

To create a bookmark in Word 2003 and earlier, place the insertion point where you want the bookmark, or select a range of text you want to bookmark then click Insert, Bookmark. Openoffice Writer is much the same. In Word 2007 the Bookmark command is on the Insert ribbon – give the bookmark a name and press Add. A bookmark name must start with a letter and, although it can contain numbers, it cannot contain spaces or punctuation other than underscores.

Although bookmarks don't print, you can make them visible – in 2007, that's in Word Options, Advanced, Show Document Content and in earlier versions in Tools, Options, View. They'll appear as a pair of grey, square brackets round the bookmarked text. This is an enclosed bookmark. If no text is selected the brackets superimpose to form an I-beam shape – a placeholder bookmark (see screen 1).

Openoffice doesn't seem to have a way to make bookmarks visible, though the Navigator gives a non-modal (open all the time) list of bookmarks in a document (see screen 2). Click on an entry in the Navigator bookmark list and the bookmarked text will be highlighted in the document.

So what can you do with bookmarked text? The obvious use is in navigation. You can jump to a bookmark either from the Insert Bookmark dialogue or the Edit, Go To command. Openoffice users can also use the Navigator. The Word Insert Bookmark dialogue has a 'Hidden bookmarks' checkbox. This doesn't hide your own bookmarks (though you can add hidden bookmarks with a macro), but hides or shows the bookmarks Word uses, such as table of contents entries and captions.



You can use bookmarks to create cross-references in a document. Select some text, a person's name, for example, then Insert, Bookmark and name it, 'name'. Now go elsewhere in the document and Insert, Reference, Cross-reference (Insert, Links, Cross-reference in 2007). In 'Reference type:' choose Bookmark and in 'Insert reference to:' choose Bookmark text, then choose a bookmark from the list. This will insert the bookmarked text at the current position (see screen 3).

If you create a hyperlink when you do this, when you click (or Control and click, depending on your Word options settings) you will be taken to the original bookmark.

Bookmarks come into their own in automating documents with macros and fields. Word has a range of built-in bookmarks but they don't appear in the dialogue and you can't 'Go To' them in the normal manner, but you can use them in macros. For example:

```
Selection.GoTo What:=wdGoTo↙
Bookmark, Name:="\PrevSel2"
```

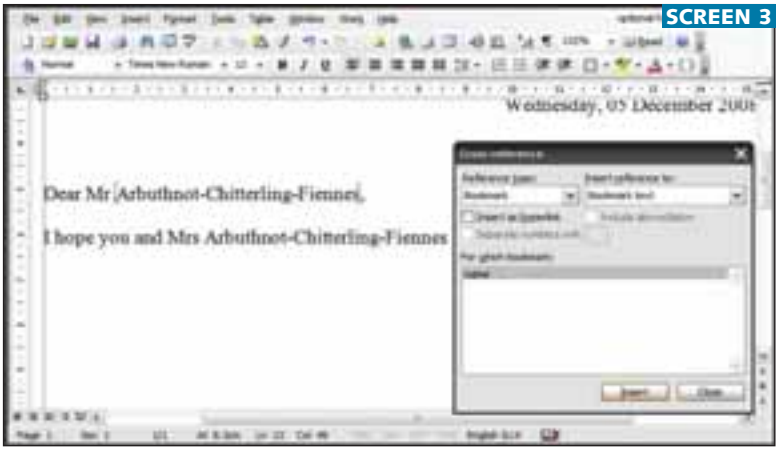
(Key: ↙ code string continues)

will take the insertion point or selection back to the last position but one – like executing the 'GoBack' command (Shift and F5) twice.

Here's a simple DIY macro that uses bookmarks: a letterhead template, Letter.dot, contains your address, phone number and so on, a few blank lines and the salutation 'Dear' all waiting for you to supply a name.

Enclosed and placeholder bookmarks

Openoffice Navigator shows your bookmarks



Using cross-references to repeat yourself

Open the template, rather than create a new document based on it, and between your address and the salutation type 'today'. Select this, Insert bookmark and name the bookmark 'date'. Create a new macro named Autonew containing:

```
Sub Autonew()
ActiveDocument.Bookmarks↙
("date").Select
Selection.InsertDateTime ↙
DateTimeFormat:="d MMMM, ↙
yyyy", InsertAsField:=False
End Sub
```

Save Letter.dot and close it. When you create a new document based on Letter.dot, the Autonew macro selects the bookmark named 'date'. As the bookmark consists of a selection, the word 'today' is replaced by the result of the InsertDateTime command. The DateTimeFormat gives a date of the type '3 January 2009' and the InsertAsField:=False part makes sure the date is inserted as ordinary text, rather than a field, so it always stays the same in that particular letter.

You can't prise open a placeholder bookmark to give it content, but you can change the content of an existing bookmark. So, for example, you could add a bookmark called 'name' to your letter template after the salutation containing dummy text or just a space. Then you'll be able to type into it. Cross-referencing the bookmark will then show what you typed in, rather than the original dummy text. Any existing cross-references will be updated when you select them and press F9 or do some other field-updating action such as printing the document.

Placeholder bookmarks have another peculiarity, in that they are determined to stay put. If you put the insertion point a few characters before or after one then use the Delete or Backspace keys you'll find this 'jumps over' the bookmark and it doesn't get deleted – however, if you select surrounding text then delete, the bookmark will vanish as well. Enclosed bookmarks behave rather differently – the insertion point will move into the bookmarked text and delete it, just as it would normal text. However, once the end (or beginning) of the bookmarked text is reached the bookmark vanishes.

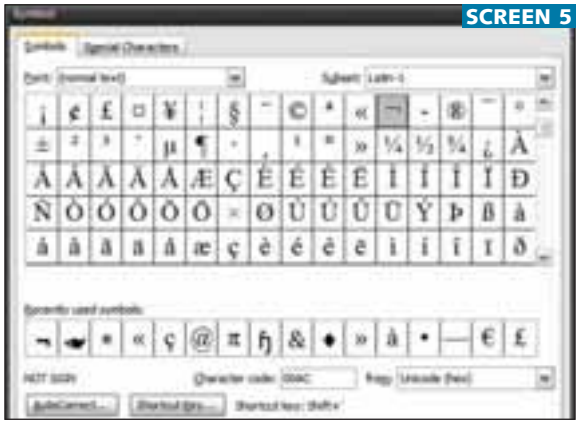
Nota Bene

Below: Nota Bene, a different kind of word processor

Bottom: Not the same – the logical not sign

Last month we concluded our series on long documents with indexing, but Tim Moore wrote in to draw our attention to Nota Bene, which in his experience of 25 years "is far and away the best word-processor for any purpose" (see screen 4). It has multilingual support including Syriac, Akkadian, ancient Greek, Cyrillic and Hebrew, which can all be combined in the same document. It also means something different by 'styles'. Whereas most Word processors use styles as a set of formatting options, Nota Bene takes this to mean a publishing style, such as Chicago Manual of Style, Turbanian or Modern Language Association. So, for example, you can convert a document so that all citations of the form '(Thomas, 1971)' become footnotes of the form 'op.cit. 1971'.

Its interface isn't going to win any beauty contests, but if you're involved in academic writing – especially multilingual – it could be just the thing. You can get a 30-day (non-printing) trial from **www.notabene.com**.



Word weirdness corner

John Palmer had a puzzling problem. He'd scan and use optical character recognition (OCR) to get documents into Word, and often find occurrences of the character ¬; that thing at the top left of the keyboard, what you get with Alt and 0172, or to give its official name, the logical not sign.

Scanning and OCR often produces spurious characters and the documents usually need cleaning up, so John did a Find and Replace. But it wouldn't work. No matter whether he typed, copied or used Alt and 0172, the Find command ignored all existing instances in the document. Stranger still, when he copied and pasted text containing the symbol into an email or text file, the symbols vanished. After several exchanges of mail, the penny dropped. These weren't literal characters – they were Word's representation of optional hyphens, as you can see from Insert, Symbol, Special Characters (see screen 5).

Optional hyphens serve to indicate where a word should be hyphenated should it break over a line. For example, you can specify that the word 'multilingual' breaks as 'multi-lingual' rather than 'multiling-ual'. Although, as we've seen you can insert literal not signs which look identical to optional hyphen marks, the two don't behave in the same way. Optional hyphen symbols don't print and disappear when you hide formatting marks. However you can search for – and replace – them. In the Find and Replace dialogue, click the More button, then the Special button, then Optional Hyphen. **PCW**

Stephen Wells is a freelance journalist and a regular contributor to computer magazines. He's been writing PCW's Spreadsheets column for over 10 years.

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Functions and formulas

A selection of hidden Excel gems to boost your productivity

A spreadsheet function is a built-in mini macro designed to save you time and the computer's memory. The first function, and still the most widely used one, is SUM. When totalling the contents of a range of cells, instead of using `=A2+A3+A4` and so on down to A100, you can simply enter `=SUM(A2:A100)`. Instead of entering `=SUM(A2:A100)/99` you can use `=AVERAGE(A2:A100)`.

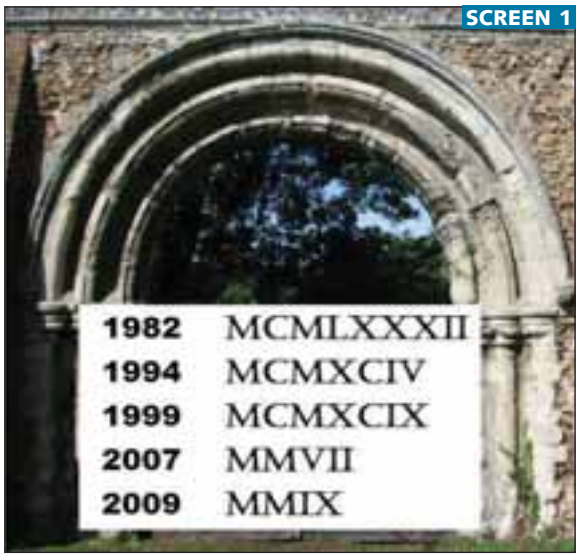
Functions that apply to a range such as this are not limited to a group of cells on one worksheet. If a workbook has 12 worksheets labelled Jan to Dec, you can total all the entries in, say, cell G19 using `=SUM(Jan:Dec!G19)`. This is known as a 3D formula. Instead of being limited to a two-dimensional worksheet, it drills down through all the worksheets in the workbook.

There are Excel functions designed for people with diverse interests: engineers, financial analysts, time-keepers, statisticians and more. A few functions are only available if you use the Analysis Toolpak. To add these, choose Excel Options and select the Analysis Toolpak from the list of Add-Ins. Some functions have been added with each new version of Excel, while others are undocumented and included to make Excel compatible with other spreadsheets, such as Lotus 1-2-3 or Quattro Pro.

This column is about the functions and formulas containing them, which can help solve everyday problems. How about figuring the odds of being successful in a lottery? If each lottery number contains three numbers, each of which can be between 0 and 99, then the permutation function tells you the odds of winning are 970,200 to 1. Just enter `=PERMUT(100,3)`.

Of course, that's only if the three numbers have to be in a certain order to win. The number of permutations is much larger than the number of combinations. In probability theory, a combination refers to any arrangement of the three numbers, not just a specific one. In that case, `=COMBIN(100,3)` tells you the odds of winning are improved to 161,200 to 1.

SCREEN 1



The Roman function translates dates for you

Look before you leap

Want to check if a year is a leap year? Enter a year in cell A1. In B1 enter

```
=IF(OR(MOD(A1,400)=0,AND(MOD(A1,4)=0,MOD(A1,100)<>0)),↙
"is a leap year",↙
"is not a leap year")
```

(Key: ↙ code string continues)

This tells you that 2008 is a leap year and 2009 is not a leap year. The formula uses four different functions: IF, OR, AND and MOD. The MOD function returns the remainder after a number has been divided. For example, 13 divided by three equals four with one over. So `=MOD(13,3)` displays 1. Incidentally, you might wonder why 2000 is a leap year and 1900 is not. This is because of the rule that centurial years are only leap years if they are exactly divisible by 400.

Speaking of dates, you can easily calculate the traditional date you can retire. Enter your birth date in cell A1. To find the first day of the next month after you reach 65, in A2 enter

```
=DATE(YEAR(A1)+65,↙
MONTH(A1)+1,1)
```

If you want to find out the last day of some future month, you can use the end of month function. Just enter `=EOMONTH(TODAY(),6)` to see the last day of the month six months from now.

Excel offers a function for creating Roman dates. Enter `=ROMAN(2009)` and you'll get the answer MMIX. In

How to change names in mid-sentence

SCREEN 2

=$B$1&", "&C1&" "&$D$1

	A	B	C	D
1	Did you know, Arthur, that your sub is due?	Did you know	Arthur	that your sub is due?
2	Did you know, Basil, that your sub is due?		Basil	
3	Did you know, Gus, that your sub is due?		Gus	
4	Did you know, Meg, that your sub is due?		Meg	
5	Did you know, Pamela, that your sub is due?		Pamela	
6	Did you know, Peggie, that your sub is due?		Peggie	
7	Did you know, Robert, that your sub is due?		Robert	
8	Did you know, Ron, that your sub is due?		Ron	
9	Did you know, Sidney, that your sub is due?		Sidney	
10	Did you know, Valery, that your sub is due?		Valery	
11				

Roman numbers, M stands for millennium and I before X means one less than 10. I after X means one more than 10, or 11 (see screen 1).

If you want to count the number of occurrences of a certain month in a range of dates, name the range Dates. To do this, highlight the range and type Dates in the Name box to the left of the Formula Bar. In any cell, say A1, enter the number of the month you wish to count. For all the Januarys enter 1. For all the Decembers enter 12. Format the cell in which you wish to display the number of occurrences as a number with no decimal points.

In that cell, enter the formula, `=SUM(IF(MONTH(Dates)=A1,1,0))` and press Ctrl, Shift and Enter, as this is an array formula. Excel will add curly brackets around the formula to reassure you it understands this is an array formula; this means each date will be examined individually. If the number in cell A1 is 4, the formula will display the number of dates in the range that fall in April.

If you have a list of property sales with the dates in one column and the amounts in another, you can find the highest sale in a particular month in a particular year. Let's say the dates are in the range F2:F25 and the amounts in G2:G25. Enter in cell B4:

```
=MAX(IF((YEAR(F2:F25)=B1)*↙
(MONTH(F2:F25)=B2),G2:G25))
```

Again, this is an array formula (it searches all the cells in a range), so you have to use Ctrl, Shift and Enter. You can now enter the year you are researching in cell B1 (say, 2008) and the number of the month (say 4, for April) in cell B2. No matter how many sales were made in April 2008, this formula will find the highest one.

You can forecast the crowd numbers at a future football match based on historical figures using the FORECAST function. List the previous attendances in B2 to B7. In cell B8, enter

```
=FORECAST(7,B2:B7,↙
{1,2,3,4,5,6})
```

and there is your answer.

That's odd

Some of the functions mentioned in this column may seem odd, particularly the ODD function. Most spreadsheet rounding functions round up all decimals from 0.5. Excel has 10 rounding functions that do that. But the ODD function rounds any decimal up to the next odd integer. So `=ODD(5.6)`, `=ODD(6.6)`, `=ODD(5.3)`, and `=ODD(6.1)` will all give the answer 7. Correspondingly, `=EVEN(5.4)`, `=EVEN(4.1)`, `=EVEN(5.9)`, and `=EVEN(4.8)` will all give the answer 6.

SCREEN 3

An Excel loan repayment calculation (in a scroll shape)

Now here's a useful formula. If you want to include a sentence such as, 'Did you know, Arthur, that your sub is due?' in a form but also change the names of the club members it's addressed to, list the names in column C and split the sentence between columns B and D (see screen 2).

In cell A1 enter the formula, `=$B$1&", "&C1&", "&$D$1` and drag down the column. Instead of figuring out a complicated formula for calculating the monthly repayments on a loan, using the interest rate per period, the number of payments, the present value, the future value and whether payments are to be made at the beginning or end of the month, the PMT function will do it for you.

If you wanted to borrow £90,000, amortised over 25 years, at 6.5 per cent interest, here's how to use the PMT function. Enter 90000 in cell B1, 300 in B2 (25 years x 12 monthly payments) and 6.5% in B3. In B4 enter, `=PMT(B3/12,B2,-B1)`. The minus in front of B1 is because the payment is money going out. This payment would be £607.69 (see screen 3).

There is an optional fourth argument of future value, but as this will be zero when the loan is paid off it can be omitted. An optional fifth argument is type. If the type is 0 or omitted, then it means the payments are made at the end of each month. If they were to be made at the beginning of the period then the type would be 1. Some UK institutions calculate repayments differently.

How about saving money rather than borrowing it? If you want to calculate how much you would have if you invested £10,000 for two years at 4.25 per cent, you could use the formula, `=10000*104.25%*104.25%`. You would find that the future value is £10,868.06. But if you wanted to be able see the difference if the amount invested, the interest rate or the number of years changed, it would be better to enter the £10,000 in cell E1, the number of years in E2, and the interest rate in E3, then in E4 you could enter `=FV(E3,E2,0, -E1)`. The £10,000 is the amount you are handing over to the financial institution so it is entered as a negative.

Finally, the DATEDIF function gives the interval between two dates and allows for leap years. Borrowed from Lotus 1-2-3, it was introduced in Excel 5, but undocumented in every version except Excel 2000, though the function is still available.

If you enter someone's birth date in cell C5 you can see how old they are by entering

```
=DATEDIF (C5,TODAY(),"y") & ↙
" years"
```

in another cell (see screen 4). PCW

Calculate someone's age from their date of birth

SCREEN 4

Nigel Whitfield edited computer magazines before going freelance in 1995. A specialist in internet and consumer issues, he has a degree in Computing Science from Imperial College.

→ **Comments welcome on the Web development column. It returns in the April issue.** Email webdev@pcw.co.uk *Please do not send unsolicited file attachments.*

Going mobile

Some solutions for making your website mobile

Mobile web access has come a long way since the days of Wap, when over-optimistic phone networks put thousands off with a dismal rendering of a few sites. Modern handsets such as the Apple iPhone make a pretty good stab at rendering standard web pages, as do smartphones with Windows Mobile and Symbian operating systems. But, as anyone who has used them will know, they can often be quite frustrating, especially when sites use scripts and plug-ins for some of their essential content. And I'm sure I'm not the only Hands On reader who has experienced crashes and other glitches that mean having to restart your mobile browser – or even the phone itself – and then navigate back to where you were.

All in all, while the annoyances of Wap may be long gone, and with it the need to come up with a whole new way of coding pages just for mobiles, only the naive would say that the mobile internet is anywhere near as simple and straightforward to use as on the desktop.

We could hope for everyone to have devices with big screens and accurate rendering, something that the iPhone manages quite well, or suggest that for real browsing you need a slightly bigger screen, such as Nokia's internet tablets or even a netbook. But, in the meantime, what can you do if people want to use your website on a mobile? This month, I'm going to look at some of the options.

Go with RSS

I've talked before about the *Guardian*'s website and the annoyance of having adverts even in the 'ad-free' version, which can result in quite a lot of data being downloaded unless you switch off all images. But they do deserve some praise for a recent change to their RSS feeds, which has the side effect of making more of their content available on some mobile devices.

The Guardian's full-text RSS feeds mean you don't have to access the web page itself. If it's the content you're interested in, it's all there

The latest update to its feeds has added – alongside neat features such as geotagging, which I'll look at in another column – the full text of most of its articles (see screen 1). So if your mobile browser supports RSS feeds, such as the one built in to many Symbian phones, then you can simply grab the information you want that way, without having to visit the site and fetch all the associated graphics, CSS and so on. It means you can also set your phone to update regularly and always have the latest stories to read.

If your site is updated regularly and you can put the full text of articles into the feed, this is one way of making it accessible – but only, of course, to people who have RSS readers on their mobile phones.

Already went

The official way that the *Guardian* suggests its users access the site from mobiles is through its Avant Go channel (see screen 2). Avant Go (**www.avantgo.com**) was a great little service back in the heyday of the Palm Pilot, syncing PDA-friendly versions of web pages automatically for you. You can now go to **http://m.avantgo.com** for a mobile web version which, on my Nokia N95 at least, features pages that require you to scroll around to see everything on them.

As a site publisher, you can show your readers how to create a custom channel and, in theory, it'll be available on a wide range of devices. I'd love to hear how other readers get on – my own experience is of broken links, missing news stories and sync problems. In short, it's not a method I'd recommend people look at for getting their own site online.

So, what can you do? As a user, it's worth looking at Opera Mini (see screen 3) at **www.operamini.com** – this Java-based browser will run on a huge number of mobile phones, including plenty that wouldn't be classed as smartphones. And it does a pretty good job of reformatting pages on the fly, fitting them on a small screen and avoiding having to scroll sideways as well as up and down.

In fact, the latest version has some handy features, including the ability to group links into collapsible sub-sections on a page, as you can see in screen 1. It's not perfect, especially if you're aiming to get exactly the same feel on the mobile as on the desktop, but the mobile mode does make pages easy to use – and in full-page mode, you can see what's on a page and go to the bit you're interested in much more easily than with the standard Symbian browser, for example.

Avant Go was once a neat solution for accessing news sites on devices such as the Palm organisers

It's also worth looking at Opera's website, where there is a section specifically for web designers with information on the capabilities of the mobile browser and tips on creating websites for people on the go. Rather than shamelessly recycling their information, I'll point you instead to **www.operamini.com/developer**.

Media player update

No sooner had I extolled the virtues of the JW Flash Media Player (**www.jeroenwijering.com**) for adding video to your site in the PCW Christmas issue than there was an update to the software. The new version, 4.2, adds some useful features that can give your site and its video a more professional feel, thanks to a plug-in system. Among the plug-ins available is one that provides an 'embed' code, so that other people can use your video easily in their sites – just watch your bandwidth bills though – and a 'viral' plug-in, which allows viewers to send people links to your video and view other recommended content.

The screen (right) shows the example video I created last time, with the viral plug-in added – which is just a matter of adding `&plug-ins=viral-1` to the end of the flashvars section of the code. The plug-in doesn't need to be copied to your server and is downloaded over the internet automatically.

When the player loads, a small arrow icon appears at the top-left of the screen, and clicking on it will allow you to select the embed code, a link to the page with the video, or a list of recommended video content. I've not done any additional configuration, but you can customise or hide the URLs and the embed code.

It's a great way to encourage visitors to show your video to other people and help them find extra content on your site via the recommendations option.

Add the 'viral' plug-in to JW Player, and visitors to your site can easily link to your clips, or recommend them to other people

Mobile with Mippin

I've talked in the past about ways to customise your site, checking the headers sent by browsers, for example, and choosing a different style sheet to give a better result for people with specific browsers, including mobile ones. Or, of course, if you have a fairly simple site, it may degrade quite well on a small screen, without needing too much alteration. But that's not always the case. Sometimes you just want to make your site accessible without having to do lots of hard work. One solution is Mippin (see screen 4) at **www.mippin.com**.

Opera's latest portable browser is small and fast; worth recommending to your site's visitors

Aimed largely at bloggers – it needs a site to have an RSS or Atom feed – Mippin can take a lot of the work out of creating a mobile version of your site. In fact, it does pretty much all of it for you; pop along to the website, click the Bloggers link on the front page, then click 'Mobilize your blog now' and work through the steps. You can choose the layout, alter the colour scheme and then create an account. You can even generate income through advertising. And, in theory at least, new readers may find you through the Mippin directory. *PCW*'s labs blog is at **www.mippin.com/testbed**.

There are some other handy tricks, too, including plug-ins for many blogging platforms which will ensure that when someone visits your site from a mobile device they'll automatically be redirected to the Mippin version of your pages rather than being at the mercy of whatever their mobile browser thinks is the best thing to do with them. It's definitely worth having a play – and you can also explore Mippin using a mobile phone emulator on their home page.

Above: Mippin makes it easy to create a mobile version of your blog

If anyone has any other ideas on how best to make a website more mobile friendly, I'd be interested to hear them. And if you fancy some inspiration when it comes to mobile web matters, you might also like to take a look at the Mjelly blog, **http://blog.mjelly.com**, which covers a wide range of issues from advertising to what exactly you should call the mobile version of your site. **PCW**

Alan Stevens has implemented and supported networks for over 25 years, working for IT vendors, system integrators and customers. He now mostly researches and writes about networking matters.

→ Comments welcome on the Networks column.
Email networks@pcw.co.uk
Please do not send unsolicited file attachments.

Lock down your computers

Learn some simple and effective access controls for public computers

Looking after PCs is a never-ending task, even on a small home network. It's amazing just how much can be downloaded and installed when you're not looking, not to mention all those little changes to program settings, desktop layouts, wallpaper and themes. In this month's column, I'm looking at how you can stop all that, using a tool called Windows Steadystate (WSS), which can be used to lock down PCs and undo unwanted changes every time they're restarted.

Getting started

Previously known as the Shared Computer Toolkit, the latest release of WSS (2.5) is a Microsoft tool that can be downloaded free and used with both Windows XP and Vista. It can be installed on any 32-bit version and there are no prerequisites, although you will need plenty of free disk space to use the Windows Disk Protection (WDP) option, which I'll discuss later.

Designed for use in schools and to protect publicly accessible 'kiosk' computers at conferences and shows, WSS can be used to manage any PC you want, be it a home system that needs to be protected from inquisitive youngsters or a small-business desktop shared between several users.

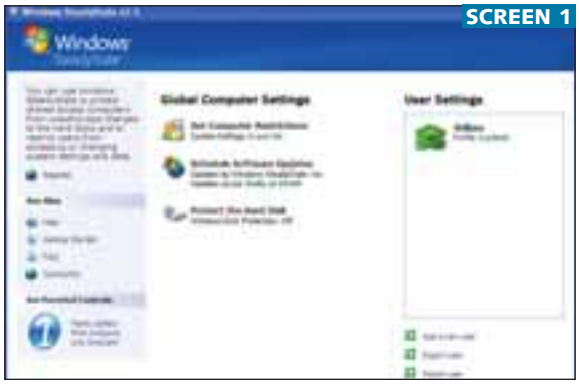
It's not perfect and the Steadystate software does have to be installed on every PC to be locked down, but it doesn't take long and, once you've configured a user profile or two, they can be exported to other PCs rather than having to start over every time.

Fresh OS

Ideally, you should start with a fresh install of the OS with the latest updates applied. However, it's not essential and I've only encountered one or two problems putting WSS to work on any of the computers I've tried; mainly involving more exotic applications that few home or small-business users are ever likely to run.

That said, it's worth taking the opportunity to do a bit of housekeeping before installing WSS to get rid of any unnecessary folders, files or programs and clear out browser caches and so on. Also make sure that any applications you want to run are installed before you do anything, together with your usual anti-virus, spyware and other security products.

Installation takes just minutes. A desktop shortcut is created during the process, taking you to the management interface (see screen 1) from where you can set up both the global WSS options and specific user profiles.



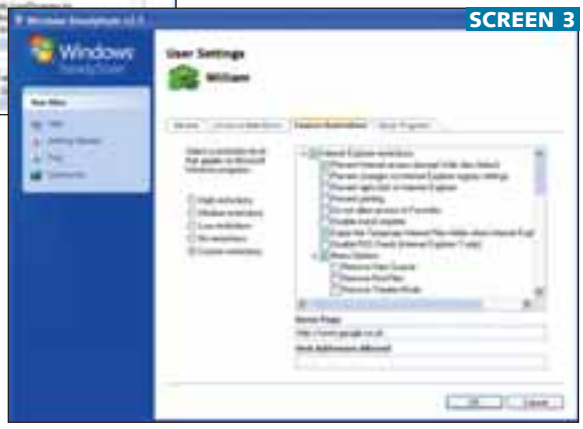
The Steadystate interface lets you lock down global and individual user settings

Making it work

For this article, I loaded WSS on to a Windows XP Pro notebook. The default computer restrictions seemed fairly general, so I left them alone and, likewise, left the other global settings as they were. Instead, I went straight to user settings, creating a new user (William in the examples here), then specifying exactly what that user would be allowed to see and do.

There's no magic involved, WSS simply creates a normal Windows user account, then puts together a custom user profile that it uses to apply a combination of controls that are already available, such as local group policy settings, mandatory profiles and application defaults. By themselves these can be complex and time-consuming to configure, as well as easy to get wrong. WSS simplifies the process, letting you choose preset low, medium or high restriction sets that can be customised further.

Above: When setting Windows restrictions, you can opt for preset settings or customise the options yourself



Right: Feature restrictions are mostly used to manage access to IE and Office

There are two main tabs through which restrictions can be configured. One for Windows (see screen 2) and another for more specific feature options (see screen 3). On the Windows tab you can choose to do things like restrict what users are shown in the Start menu, prevent them changing the Windows Taskbar, editing the Registry, running Notepad and so on. You can also remove the built-in CD and DVD burning options and hide individual drives, including those mapped to network shares.

Feature restrictions are mostly concerned with Internet Explorer and Office; for example, removing individual tabs from the internet options dialogue and turning off the Detect and Repair tool. You can also set the default home page and limit browsing to particular web addresses. That said, WSS is far from a true content management tool and shouldn't be used as such. Also, you can't lock down third-party applications, although you can block access to installed programs (see screen 4).

Windows Disk Protection

You can lock user profiles to stop them being altered; however, if you do you're missing out on a whole extra layer of defence in the form of Windows Disk Protection (WDP), which can automatically undo any changes made to the system partition during a user session. This is similar to System Restore, which only protects key Windows settings; you can use System Restore alongside WDP.

To protect the disk, WDP creates a large cache (C:\Cache.WDP), in which any file changes are held. The latest implementation of WDP is able to create the cache without having to repartition the disk as in earlier versions. Space, however, can still be an issue. The WDP cache will normally take up half of the available disk space (up to a maximum of 40GB), although you can reduce this to 2GB.

By default, WDP will be turned off and should be left that way until you've configured all your settings as the lock-down applies to everyone but Administrators, who can still commit changes to disk when they log off through a special dialogue.

The default is also to undo changes (ie clear the cache) every time the PC restarts. This, when combined with the ability to reboot whenever a user logs out, lets you present the PC in pristine condition whenever a new user logs on. Alternatively, you can retain changes until a specific date and time, for example, to allow a user to work on a project and save files locally for a fixed period. Another option is to temporarily disable WDP to, for example, install a new application without having to remove and then reinstall the cache.

LLTD and Windows XP3

Many thanks to reader Mayo Marriott for highlighting a problem caused by the Windows XP SP3 update when networking XP and Vista machines together. With Vista, you can build graphical maps of computers and devices on your network, and Microsoft has started to use LLTD (the Link Layer Topology Discovery protocol) to enable this to happen.

LLTD is supported in both Vista and Windows Server 2008 and can be added to Windows XP by downloading the LLTD Responder package from **http://support.microsoft.com/kb/922120**. Unfortunately, if you've already applied SP3 to a Windows XP system, problems are likely to arise.

It looks as though the LLTD Responder was supposed to be a part of the SP3 update, but somehow got left out. If you've already installed the software before applying SP3 you're OK, but if you try to run the LLTD Responder download (WindowsXP-KB922120-v5-x86-ENU.exe) after upgrading to SP3 you'll get an error message telling you it's only installable on Windows XP with SP2.

The good news is it's not insurmountable. The bad news is Microsoft doesn't make it easy. The official solution is a hotfix – effectively a V6 version of the package for XP machines with SP3 installed. To this end the Knowledgebase link has been updated with details of the hotfix, plus a button you can click to request it. Unfortunately, it can't just be downloaded as normal; rather, when you click this button you have to supply your email address and a time-limited link to the download will be sent to you.

XP PCs can be included in Vista network maps

The unofficial workaround is to extract the files from the original package and install them:

1. Manually extract the files to a folder of your choosing (c:\somefolder in the example) by opening a command window and typing:
`WindowsXP-KB922120-v5-x86-ENU ↙ –x:c:\somefolder`
(Key: ↙ code string continues)
2. In the folder you extract to, open the folder SP2QFE and copy rspndr.sys to C:\Windows\System32\Drivers and rspndr.exe to C:\Windows\System32. Open the sub-folder called IP and copy rspndr.inf to C:\Windows\Inf.
3. Finally, from a command window, change directory to C:\Windows\System32 and type
`rspndr.exe -i`
to install the LLTD responder.

You can check it has been installed by looking for an LLTD entry in 'your network connection' properties.

Although WSS can't manage third-party application features, you can block use of selected programs altogether

SCREEN 4

Update exceptions

Some of you may be wondering what happens to Windows updates that are downloaded while WDP is turned on. These ought to be reversed when the PC is restarted, just like any other change, but Steadystate has a separate set of parameters to handle this important feature.

Windows updates can be scheduled for a particular time slot when the PC will be automatically restarted with WDP temporarily disabled. Updates will then be downloaded and applied along with those for specific security applications such as anti-virus scanners, although the number supported is limited. You can get around this with custom update scripts which can be scheduled to run at this time, before the PC is again restarted with WDP reset to operate normally. For more go to **www.microsoft.com/windows/products/winfamily/sharedaccess**. **PCW**

Mark Whitehorn is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars.

→ Comments welcome on the Databases column.
Email database@pcw.co.uk
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Dates and databases

How to use the Datevalue function to solve data migration woes

Not long ago, I was working on a database that contained a table with a couple of date columns (nothing strange there) and my task was to transfer this data into a table in an entirely different DBMS. The dates were stored with both date and time components (05/02/2009 11:14:35, for instance), but the system into which they were to be transferred would only accept the date portion. I thought about converting the date/times into a string, extracting the date part and converting it back into a date with the Datevalue function, perhaps with an Access expression such as this:

```
DateOnlyOrderDateComplex: ↙
DateValue(Left(Str([Order ↙
Date]),10))
```

(Key: ↙ code string continues)

This uses the String function to turn the contents of the Order Date column from date/time data into a string. The Left function extracts 10 characters from the string counting from the left, for example, reducing 05/02/2009 11:14:35 to the 10 characters 05/02/2009. Finally, Datevalue turns that string back into a date without the time component.

But then I remembered an obscure (well, obscure to me) party trick that Datevalue can perform, which I had to look up to verify. Datevalue is normally used to convert strings to dates, and so one normally feeds it strings of characters. But if you feed it date and time data instead, it will return just the date element. It simply ignores the time element.

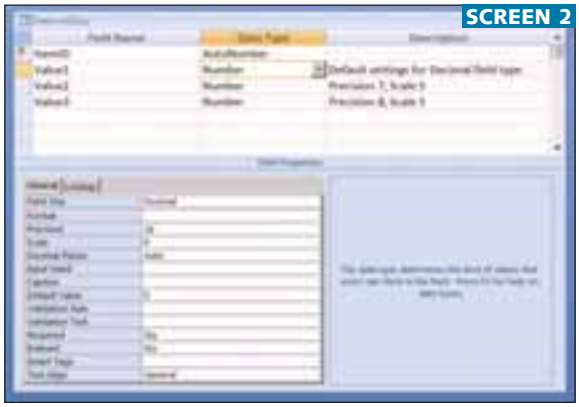
My Access expression can be simplified in a very satisfactory way (see screen 1) to:

```
DateOnlyOrderDate: ↙
DateValue([Order Date])
```

And this is the SQL (the sample table Orders and the query TimelessOrderDate are in DbcFeb09.mdb, which you'll find on this month's cover disc):

```
SELECT Orders.OrderID, ↙
Orders.[Order Date], ↙
DateValue([Order Date]) AS ↙
DateOnlyOrderDate
FROM Orders;
```

SCREEN 1



SCREEN 2

Top: This query shows off the trick that the Datevalue function has up its sleeve

Bottom: The default settings for the Decimal field size in Access

Decimals, precision, scale

Displaying decimals in Access has been giving reader Jerry Ward a headache. His straightforward requirement is to store values such as 12.345, 123.45, 1.23456 and 12.34567.

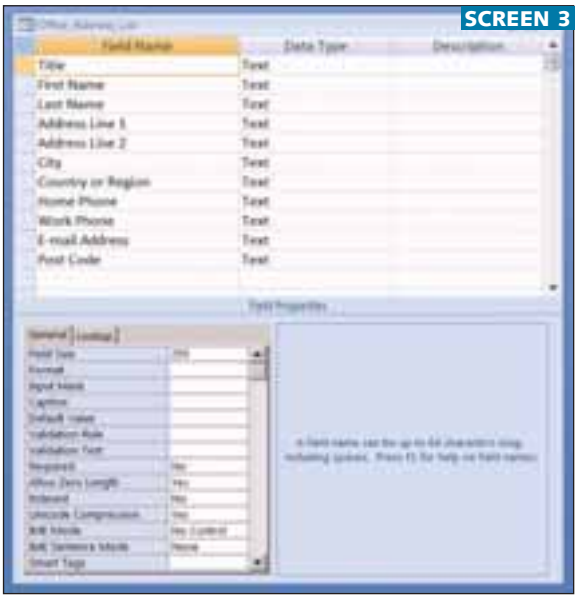
When designing his table, he created a Number type column, set its Field Size to Decimal and the Decimal Places property to 5. Into his table he entered the value 1.23456, expecting to see just that. But no, the numbers appeared as he typed, yet everything after the decimal place vanished as soon as the focus left the cell. Not unreasonably, he wants to know why.

Jerry's problem is that he is being not only reasonable, but also logical. You'd think that setting the property called Decimal Places would do the job, especially as the explanatory text alongside reads, 'The number of digits that are displayed to the right of the decimal separator'. But let's take a step back. The Decimal field size has two other properties that are worth investigating: Precision and Scale (see screen 2).

Precision determines how many digits can be stored in total (counting those on both sides of the decimal point). The default setting is 18, which will encompass all the sample values shown above and more. Indeed, at first glance it would appear that a precision of 7 would hold them all.

Scale determines the number of digits that can be stored to the right of the decimal point. So here is the crucial difference. The Decimal Places property is about display, while it is the Scale property that controls storage. If you don't store them you can't display them and the default Scale value is zero. So, this is what was causing Jerry's problem. Altering Scale to 5 will allow the field to hold all the sample numbers in the form shown above.

It is also worth noting that Scale and Precision interact. If we set the Precision (number of stored digits) to 7 and the Scale (number to the right) to 5, the value 123.45 is rejected. This is because we have stated that seven digits can be stored in all and five of those are reserved for digits to the right of the decimal place. That only leaves two for digits to the left of the decimal place. We would need to increase the



This table is a list of mail merge recipients generated from within Word 2007

Precision to 8 in order to accommodate this number. This will work until we need to enter a value such as 1234.56789, whereupon we would need to increase the precision again.

Of course, once you understand all this you find you have a fine level of control over the values that are acceptable in the column. If you don't want to be a control freak, you can simply leave the default Precision at 18 and just alter the Scale to suit.

Having settled how the data is stored, we can use the Decimal Places property to define how the data is displayed. With the Decimal Places property set to its default of Auto, the Currency, Fixed, Standard, Percent and Scientific formats display values to two decimal places. The table Decimaldata in the sample database on the cover disc has three decimal columns, each with different Precision and Scale settings.

Mobile update

Some months ago I started using Vodafone's Mobile Broadband USB and was smitten: it gave me a great, high-bandwidth connection for remote database activity and let me read emails on the train or in hotels that tend to charge extortionate prices for 24 hours of internet access.

Several months down the line and with trips to France and the US accomplished, is the attraction still as strong? Yes, indeed. During a fortnight in rural France, I stayed in contact with the current project and received all the emails that flew around; the connection was somewhat snail-like at times, but it always worked.

The experience in the US was rather less ideal as it would not give me a connection at all, but that was, in fact, perfectly reasonable as the device is designed to work only in Europe.

I've heard from a few readers on the subject. Tim David was less than chuffed. He says he tried it twice briefly (two to three minutes each) in Dubai, but it was too slow to be of any use (even for email). Then he got the bill for the Dubai experiment – about £135. On the other hand, John Langlois is a definite fan of the device. During a Siberian railway journey from St Petersburg to Vladivostok (stretching the definition of Europe slightly) he used it for email access. Signals were best when running through towns, but John was able to send and receive email from the comfort of his train compartment. "The stick worked flawlessly all the way – over 5,000 miles," he said.

Access and mail merge

Peter Moody emailed with a question about the data used in a Word mail merge, wanting to know if it is possible to save this information into an Access database.

'Access 2007 has a neat feature that lets you produce a mail merge very quickly'

Happily, having experimented with Access 2003 and 2007, the answer is yes. Briefly, a mail merge comprises a master document that contains the text you wish to send to multiple recipients. This document also contains pointers to the data that is specific to each recipient of the letter. This data is stored in a separate file – often it contains names and addresses, but it can include other information. Microsoft has taken the sensible decision (surprisingly sensible, some might say) to store the data in an Access .mdb or, for Word 2007, in an .accdb file (see screen 3).

If you choose to type in a new list of recipients, this is the default data file that Word generates, storing it in the My Data Sources folder. You can open this file in Access and it's a perfectly normal table called Office_Address_List with all the data in text fields, but with no primary key.

You can also build a table in Access, including a primary key and any other data, regardless of whether you'll want to include it in a merge or not. You can enter data straight into the table, whereupon you can tell the mail merge to use this as your list of data. Alternatively, you can point the mail merge at an existing Access table.

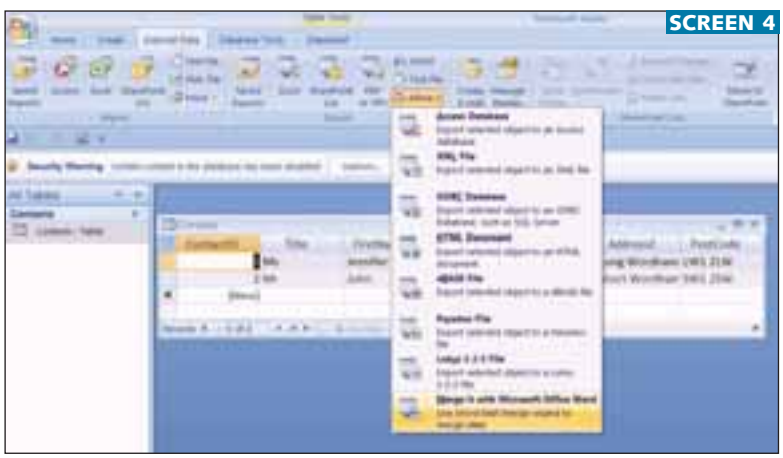
When you build the master document, you can choose which fields you want to use (you don't have to use them all) and select which contacts should be included in the merge.

Access 2007 has a neat feature that lets you produce a mail merge quickly. With a table of data open or highlighted in the Navigation pane, click the External Data tab and then click More in the Export group. Select the 'Merge it with Microsoft Office Word' option (see screen 4).

If you have an existing master document, you can navigate to it whereupon it opens up in Word with the Mailings tab selected, ready for you to select recipients or edit the master document. If you don't have an existing master document, Word opens in Mailings mode and you can create one. **PCW**

End note

Selected highlights from the Databases column are available in book form. Visit **www.penguinsoft.co.uk** for details.



You can start a mail merge from within Access 2007

Tim Anderson is an IT journalist and software developer, and began writing for PCW in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the internet.

→ Comments welcome on the Visual programming column.
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Programming for the cloud

An introduction to the web-based programming platform

Another year, another buzzword – and at the end of 2008 it was cloud computing. Microsoft even announced Azure – Windows for cloud. The term cloud computing is used in various ways. The only certainty is that cloud computing means stuff out there is on the internet rather than running on a local network – though even that distinction begins to blur once you enable internet access to an internal network.

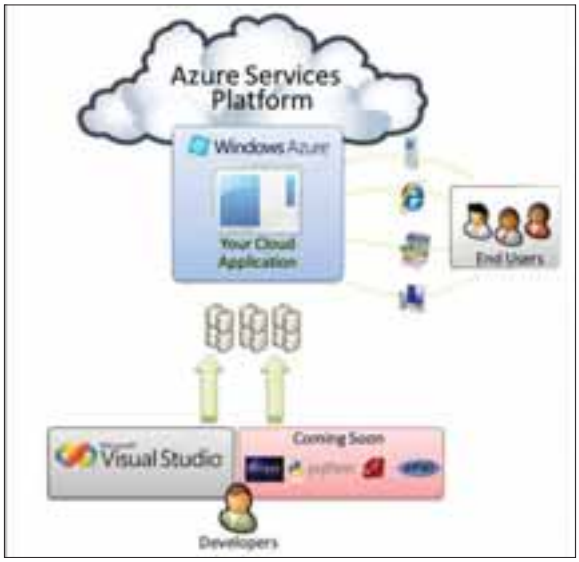
The advantage for the user is that the software and data they need is always available, provided there is an internet connection. The advantage for businesses is that the job of keeping servers up and running is offloaded to the cloud provider. Cloud computing is efficient, since you are using a shared computing resource, and all going well it should scale smoothly when demand for your application is high.

Programming the cloud can also be faster, since many of the building blocks you are likely to need are already in place. Another attraction is the ability to create mash-ups, where cloud services combine. You get the same benefit of everywhere availability, and if you are pleased with an application it is easy to share it with others, or even make it a business proposition.

Future issues will show hands-on examples of programming for the cloud. What follows is an introduction to four of the leading contenders.

Amazon

Amazon's web services include the Elastic Compute Cloud (EC2). EC2 lets you run up virtual machines on Amazon's servers on demand. These are usually Linux servers, with a choice of distributions, though there are now also options for Windows or Solaris. Amazon's virtual servers can run any kind of web application, but look much like any other server on the internet. This is a bare-metal cloud.



Windows Azure, as illustrated on the official website

Amazon also has other web services, including file storage (S3) and database storage (SimpleDB), which you can use with or without EC2. You could even have a desktop application using S3 and SimpleDB.

Salesforce.com

Salesforce.com was originally a customer relationship management (CRM) application that runs entirely on the internet and supports an unlimited number of users. The technical term for this is multi-tenanted; all the users run the same code, even though they only see their own data. More recently, Salesforce.com has gone beyond CRM, with third-party applications that run on the same core platform, called Force.com, and the ability to write your own code using a Java-like language called Apex. The latest version of the platform supports public websites as well as private applications. In contrast to Amazon's cloud, the Force.com platform does a lot for you, reducing the amount of code you have to write.

Google

Arguably you are performing a kind of cloud computing just by using Google Apps such as Gmail or Google Docs, but these are not custom applications. Google's programmable cloud offering is App Engine, which lets you write applications in Python, normally using a web framework such as Django. You also get access to a cloud database called Big Table, again hosted by Google, and other services such as Google Accounts for managing identity, as well as programmatic access to Google documents, calendar and more.

Microsoft

Microsoft showed its cloud strategy at its Professional Developers Conference last October. There are actually two approaches, though one sits on top of the other. Windows Azure is a host for ASP.Net applications, running on Microsoft's servers and backed by a range of services covering file storage, database access (SQL Services), identity and access control, workflow, and links to Sharepoint document management and Dynamics CRM.

Microsoft has also announced the Live Framework and delivered a preview. This is the Live Mesh service now opened up for custom applications. The server part of the Live Framework runs on Azure. Live Framework also has a substantial client piece called the Live Operating Environment, and a synchronisation engine that lets applications run both online and offline. You can build what Microsoft calls mesh-enabled web applications, using either HTML and Javascript or Silverlight, and install them into an application catalogue hosted by Microsoft, from where users can download them. Since Mesh-enabled applications work offline, this is an answer to Adobe's Air, which is for offline Flash applications.

Cloud comparisons

There are substantial differences between these platforms. First, it is interesting to look at the extent to which resources are shared. Salesforce.com shares the most, with its deeply multi-tenanted model. Amazon is at the other extreme, running many individual and isolated virtual machines, each with its own operating system and application code. Microsoft and Google are in between, not offering bare virtual machines as in Amazon's EC2, but still requiring customers to code their own applications.

Second, the language choices are different. With Amazon, you can use what you like. Microsoft is initially offering .Net only, but says it will enable native code later. You code for Microsoft's cloud with Visual Studio, while Google requires Python and Salesforce.com its own proprietary Apex language.

Third, each provider has its own database engine, neither of which is a standard SQL relational database manager, though you could run something like MySQL or Oracle on Amazon's EC2. SimpleDB, SQL Services and Big Table are all simplified database managers tuned for high-scale, shared use. Force.com is a database platform, with Oracle running underneath, but it has its own query language, not SQL.

Fourth, the pricing model varies. Google App Engine, currently in preview, is free for up to five million page views per month. Like Google Docs, it may remain free for generous levels of usage because of the wider business model based on advertising income. Windows Azure is free while in preview, but the final release, expected late in 2009, will be pay as you go. There are no details, but the algorithm will include CPU usage, the amount of storage, data transfer and transactions. Amazon is also pay as you go and deliberately priced keenly as a commodity. Salesforce is the most expensive, with each user paying a substantial monthly subscription.

Finally, a distinctive feature of Microsoft's cloud is its offline component for Windows and Mac. Google also has an offline capability through a browser add-on called Gears. You could argue that the Chrome browser is a rich client for Google cloud applications, but it lacks the built-in synchronisation in Microsoft's Live Framework. Microsoft has the most elaborate cloud development platform, though that is not necessarily a good thing – there is high value in simplicity.

Reasons to avoid the cloud

There are several reasons to be wary of cloud computing. The first is reliability. Cloud vendors argue that their systems are likely to be more reliable than yours, which is probably true. Still, handing over control of critical data and applications to a third party demands a high level of trust. All the cloud providers have suffered outages, and these can be costly. The second factor is how much you need to work disconnected, or with the richer features of desktop applications, though with rich clients such as Flash and Silverlight, web applications can be remarkably capable. Third, there is the problem of lock-in. Once you write to Force.com Apex, Microsoft's Live Framework or Google's Big Table, how easy is it to move to another cloud provider? It varies, but at the recent Dreamforce conference in San Francisco, Salesforce.com CEO Marc Benioff was open about this aspect. "Our job is to make sure you choose our platform because once you have chosen another platform, getting you off it is usually impossible," he said.

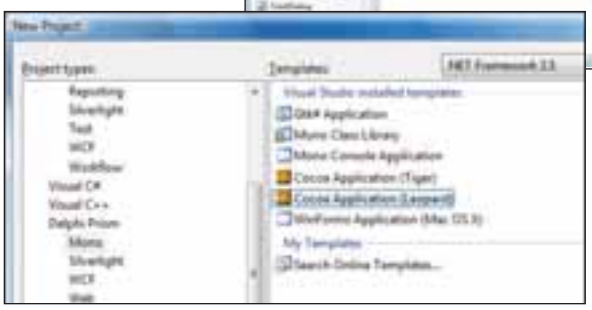
That said, Salesforce.com is the most proprietary of these providers. Code that runs on an Amazon virtual machine might well run elsewhere with little change. **PCW**

Delphi returns to .Net

In May 2008, Embarcadero announced its acquisition of Codegear, the Borland subsidiary responsible for the Delphi and JBuilder development tools. The move seems to have been good for Delphi. Both Delphi 2009 and C++ Builder 2009 are high-quality tools and have little competition as the most productive way to create native code Windows applications. But what about .Net? Several versions of Delphi for .Net have appeared over the years, but there has been little interest, thanks to buggy releases and a failure to keep up with Microsoft and C#.

Embarcadero is now trying again with Prism. This is a U-turn product. Previously, Delphi for .Net had its own IDE and developers were encouraged to use VCL.Net, a version of Delphi's visual component library ported to the .Net platform. Prism, by contrast, is a Visual Studio add-on, and rather than supporting VCL.Net it uses standard Microsoft libraries, including Windows Forms, ASP.Net and soon Silverlight.

Code for Delphi.Net in Visual Studio with Prism



A surprising option in Visual Studio: Mac Cocoa applications

Prism is based on an earlier product called first Chrome and then Oxygene, produced by Delphi add-on vendor Remobjects. Embarcadero has taken Oxygene and added support for its own technologies, including the Blackfish SQL database, Interbase and Datasnap. The most striking feature, though, is compatibility with Mono, the cross-platform version of .Net sponsored by Novell. So if you install Prism, you get options for Mac projects including Cocoa or Windows Forms for the Mac. There is a bit more to it than that, especially with Cocoa, since you need to use Apple's GUI design tools, but it is still a surprise to see these options in Visual Studio. Prism looks good if you want to code for .Net, though compatibility with existing Delphi projects is poor and it is hard to see advantages over Microsoft's C#.

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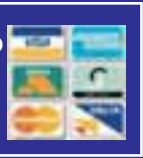

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The Shuttle G5 3300H is proof that high performance can be housed in a small chassis. Its modest dimensions are a misleading guide to the power within: there's a lot under the hood.

The PC's Intel Core 2 Duo E8400 processor has a clock speed of 3GHz, so applications can run smoothly. And there's also 2GB of DDR2-800 memory to help programs move along snappily.

The large 500GB 3.5in serial ATA hard disk provides a generous amount of space to store all your data securely. And if you want to archive important files externally, a dual-layer DVD writer will make short work of the job.

ATI's Radeon HD 4850 graphics card not only turns the G5 3300H into a games machine, but it also connects the PC to multiple displays, thanks to HDMI and DVI outputs. For further expansion, one PCI slot is left empty.

And if that's not enough, there's also a multiformat card reader on the front and the Wifi interface ensures the G5 3300H can communicate wirelessly with other PCs or the internet. To complement the package, there's a keyboard and mouse too.

This competition is open from 24 December 2008 to 22 January 2009.

More information on Shuttle and Shuttle mini-PCs can be found at **www.shuttle.eu**.

For your chance to win this fantastic setup worth £1,066, answer the question below and enter online at **www.pcw.co.uk/competitions**.

What is Shuttle Computers popular for?
A. Mobile phones
B. Mini-PCs
C. Notebooks

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This competition is open to readers of *PCW*, except for employees (and their families) of Incisive Media, and Shuttle. PCW is the sole judge of the competition and the editor's choice is final. Offer applies to residents of the UK and the Irish Republic only. Entrants must be over the age of 18 and only one entry per household will be accepted. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. Incisive Media will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. Incisive Media reserves the right to substitute the prize for one of greater or equal value if circumstances make this unavoidable. Prizes will be dispatched by the competition sponsor(s) and the name(s) and address(es) of the winner(s) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. Incisive Media will use all reasonable efforts to ensure the prizes are as described on this page. However, Incisive Media cannot accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

ENTER ONLINE AT www.pcw.co.uk/competitions

WIN! Brother MFC-990CW multifunction printer

The modern home office needs efficient, compact, sleek, high-quality technology to give that professional feel where space may be at a premium. A single machine that can act as a printer, a photocopier, a scanner and a fax is clearly going to be a great space saver, so we've teamed up with Brother to offer five *PCW* readers the chance to win one of its new multifunction devices.

The MFC-990CW has a wireless connection, allowing you to print from any room in your home, as well as a 4.2in touchscreen LCD that will let you scroll easily through the machine's menu system.

This multifunction printer is the ideal addition to the home office, with its compact design and fast printing speeds of up to 33 pages per minute.

The innovative machine also has a Bluetooth connection as standard, enabling direct printing from mobile phones and laptops.

The MFC-990CW is the product of Brother's continued investment in inkjet technology and includes an A4 version of Brother's successful and award-winning A3 6000 Series print engine.

And with the ability to print out a photograph in 30 seconds, it's also a great machine for fast home photo printing.

For your chance to win one of these printers, answer the question below and enter online at **www.pcw.co.uk/competitions**.

The competition opens on 24 December 2008 and closes on 22 January 2009.

For more information about Brother's home office products, visit **www.brother.co.uk**

Which of the following functions is not found on the Brother MFC-990CW
A. Printing
B. Faxing
C. Tea making

Please note that the accessories shown in the photograph are for illustration only; each prize consists solely of a Brother MFC-990CW.

brother
at your side

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On the web

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Our labs blog, the Test Bed, gives you regular updates on the latest gossip, technology trends and products.

→ **http://labs.pcw.co.uk** → **http://www.reportlabs.com/testbed**

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Get involved with the *PCW* community of readers, get help with your PC problems, or just join in the lively debates.

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PCW Interactive

You may recognise some entries in this blog from our Letters pages, but they are published here first, letting you add your views and comments.

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If you want to keep up with the latest news, reviews, blogs, Hands On and software downloads, then sign up for our weekly *PCW* email newsletter. It is published every Friday and gives you a selection of the highlights from the week. Our Products newsletter goes out on Wednesdays and includes the most important news stories and reviews.

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Do more with your netbook

If you've bought a netbook, it won't be long before you realise you'll need to start adding accessories and software to get the most out it. Whether it's a case, a docking station, more memory or even a new operating system, we'll guide you through the options.

Windows 7 preview

Will the next version of Windows fix the problems with Vista, or will it just be more of the same in a different box? Don't miss our insider preview of Microsoft's upcoming operating system.

Blu-ray PC drives

With ever-larger hard drives, not to mention high-definition films, a Blu-ray drive for your PC is not only the ideal solution, it's also now an affordable one. Whether you want one for backing up or movie playback, there's bound to be a suitable model for you in our round-up.

Video-editing software

Modern PCs are perfect for video editing, but what software should you use if the program bundled with your camcorder is not up to scratch? Our group test highlights the best packages for refining your directing talents.

There's lots more in March's PCW
DON'T MISS IT...

FEBRUARY 2004

From the archives: Take a look at the important events in technology five, 15 and 25 years ago.

Broadband was still something of a luxury only five years ago, but it was becoming affordable with home access costing between £20 and £35 a month. The web was still stuck in the chicken-and-egg situation in which sites and services still had to be tailored for 56K dial-up users, and would not improve until broadband use hit critical mass; and that would not happen until sites and services made the upgrade worthwhile.

Garmin was ahead of the pack with this PDA, one of the first to pack satnav, though at £586.32 it was probably for those sleek City types still making fortunes buying and selling bad debts. It came with just 32MB of Ram, so you had to spend even more on an expensive SD card to do anything useful.

AMD was enjoying a brief technology edge over Intel, though the proportion of people who actually ended up using 64-bit software was probably quite small. The 64-bit version of Windows XP was not available at review time, so we did our tests on 32-bit software. The Holly KA3219-SA was the fastest but also the most expensive and Editor's Choice went to the Mesh Matrix 64 3200 Xtra.

We reported from Las Vegas on what turned out to be the last Comdex show. Held in Vegas since 1979, Comdex was for years the world's glitziest and most influential computer show but failed because some exhibitors defected to the Consumer Electronics Show and others preferred smaller, more targeted shows.

FEBRUARY 1984

Machines with dual processors are far from a recent phenomenon. Two decades ago we looked at the £19 Xerox 16/8, which was designed to run two programs at once. This was otherwise unthinkable back in the days when machines clocked an average 4MHz.

The Xerox had a 16-bit Zilog Z80A running at 4MHz plus an Intel 8086 running at 4.77MHz. It also came with support for 5.25in and 8in floppy disks, 192KB of Ram, expandable to 256KB, and a Xerox mouse "to avoid the need to be envious of [Apple's] Lisa owners".

And before the Apple groupies start crowing about this being another case of the industry following Cupertino's holy lead, check out your facts: Apple copied the mouse (as well as the graphical interface) from Xerox.

PCW also looked at one of the first mobile computers, the £4,020 Gavilan MC. It had a touchpad and weighed 9lb (4.1kg), and came with an 80-character by eight-line screen.

FEBRUARY 1994

The February cover announced the 1994 *PCW* award results, with London's Dan Technology getting the prize for the best sub-£2,000 system. Turkey of the year went to Intel's Pentium, perhaps a little unfairly.

The first Pentiums, launched in 1993, didn't live up to expectations. They clocked only 60MHz and were slower than the faster releases of the 486. However, software had yet to be optimised for the Pentium and clock speeds were ramped up in time for the launch of Windows 95.

Winner of the best system under £1,000 was the Apple LC475, which also got a rave review. It cost £899 and was big and chunky in comparison with later Mac designs.

PCW also considered the future 'ideal home' in which you could switch pretty well everything on or off from the comfort of your armchair. Its X10 powerhouse system used the power cables themselves for carrying control signals, an early example of a data-over-mains link.

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